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THE EXPEDIENCY

OF

PROTECTION FOR INVENTIONS.

A PAPER

READ BY

F. J. BRAMWELL, M.Inst.C.E., F.R.S.,

PRESIDENT OF THE INSTITUTION OF MECHANICAL ENGINEERS,

BEFORE THE SOCIETY OF ARTS, DECEMBER 2, 1874.

WITH DISCUSSION, REPLY, AND APPENDICES.

LONDON:
PRINTED BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.
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SEP
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THE EXPEDIENCY

OF

PROTECTION FOR INVENTIONS.

BY

F. J. BRAMWELL, M. Inst. C.E., F.R.S.,
PRESIDENT OF THE INSTITUTION OF MECHANICAL ENGINEERS.

[*Read before the Society of Arts, 2nd December*, 1874.
J. Fitzjames Stephen, Esq., Q.C., *in the Chair.*]

I shall make no apology for bringing this subject before you to-night; its great importance is a sufficient reason for adding one more to the number of papers that within the last few years have been written upon it.

There is a difficulty in dealing with "Protection for Inventions," or, in other words, the recognition by the State of property in inventions, which it is believed does not affect any other subject on the law of which papers are written.

In other cases, when discussion is excited, the extreme scope of the contested questions does not go beyond the modification of the law under consideration. All parties agree that there must be a law of some kind; but with respect to the subject of patents this is not so, for there are certain persons who insist there should be no Patent-law at all; they hold it to be wrong in principle, and they endeavour, not to improve the existing law, but to make an end of it once and for all. Therefore, in a paper on the expediency of protection for inventions, written by one who believes that some kind of Patent-law is desirable, two things may well be treated of—the one, "Aye or No, shall there be any Patent-law at all?" the other, "Assuming a Patent-law, what are the best provisions to embody in it?"

To properly consider, even in the merest outline, both these questions would occupy far longer time than accords with the fair limits of a paper to be read before this Society; therefore, on the principle that it is no use dealing with details when you are in doubt about the very essence of a matter, or, to borrow the language of Parliamentary Committees, that it is idle to go into "clauses" before you have proved your "preamble," I propose in this paper to consider, and to consider only, the broad question, "Is it expedient that there should be a Patent-law for the protection of Invention?" And as I refrain from discussing the alterations of any clauses in the existing law, I must be prepared, and I am prepared, to deal with the question on the following issue:—Assume that the existing law with all belonging to it is to remain unaltered and unimproved, is it expedient that there should still be protection for inventions?

I will not urge before you the "Right" of property in invention. I am aware that advanced political economists can demonstrate there is no such thing as "Right;" and thus they admit (when they are discussing questions of political economy, but probably not at other times) that the houses they live in, the clothes they wear, and the money in their pockets are not theirs because they are "rightfully" theirs, but because it is "expedient" for the benefit of the whole community that the possession of property should be secured to individuals.

I will deal with the consideration of the Patent question upon this hard and wholly unsentimental ground, and I will abstain from appeals to those feelings of natural justice which are outraged by the suggestion that although a man who goes and dredges up an oyster, and finds within it a pearl, is to be the legal possessor of that pearl, and may call upon the laws of his country, and not call in vain, to secure it to him against all comers, another man (a Cartwright, a Watt, a Crompton, a Neilson, a Bessemer, a Siemens) is to have no property in his inventions—inventions which are pearls of great price, and are destined, not to the private enjoyment of the finder, but to the benefit of mankind. More especially does it seem unfair to inventors when we consider that their pearls have been obtained, not by a few hours of mere toil of the body, but by the employment of years in anxious thought and weary experiment.

Having made these preliminary remarks, I will now consider the question, "Is it expedient, in the interest of the community as a whole, that there should be protection for invention?"

I will take it as conceded that it is expedient there should be improvement in manufacture. Clearly all must be interested in obtaining better, stronger, more elegant, more numerous, and cheaper articles, the product of manufacture and of patentable invention. In this age (as I have recently had occasion to remark in my address to the Institution of Mechanical Engineers, as President) it should always be remembered there is not an article of food, there is not a garment, there is not a portion of the house we live in, there is not a book that we read, nor a ton of the fuel that warms us, that does not come to us on easier terms, better in every way and cheaper, in consequence of mechanical improvement; and, under our present law, nearly all such improvements constitute new manufactures, which that law recognizes as subjects of patentable invention.

Take our home-grown food; it is, under the blessing of the Almighty, the product of the skill of the intelligent farmer and of the labour of hard-working men; but of those backed by what? Not capital alone, as capital, but capital invested in steam-ploughs, in machines for sowing, in reaping-machines, in steam-engine power, in traction-engines, and in the vast number of other implements which, year by year, make the shows of the Royal Agricultural Society one of the most interesting of all exhibitions to a thoughtful man, who has the welfare of the great agricultural industry of England at heart. It is by the aid of such inventions that the English farmer, though weighed down by heavy rental, by taxes, by dear labour, and by uncertain seasons, is enabled to hold his own in the face of free trade, admitting (in fact welcoming) the unlimited introduction of food from all parts of the world.

And with regard to that food, whether it be grain, flour, cattle, Australian preserved meat, or tea, coffee, or sugar, most of this has been prepared by machinery, and machinery propels the vessels by which these products are brought to our shores.

Again, in our towns, water is laid on through every street, circulates there to supply the wants of all, and does it by the aid of mechanical inventions. And in most of our towns also, light, in the form of gas, circulates and owes its origin to a happy combination of chemical and mechanical invention.

As for clothing, it would be a waste of time to enlarge upon the extent to which mechanical invention comes into play. The cotton manufactures of Lancashire, the woollen and linen manufactures of Yorkshire, the lace and hosiery of Nottingham and Leicester, all are the results of mechanical invention. Again, our movement from place to place (unless the journey be a very short one) is due to some of the highest developments of mechanical skill in the locomotive and in the iron steam-vessel.

So much for the conveyance of our bodies. Next for the conveyance of our thoughts, whether this be done in the form of letters carried by the post, or of books printed and circulated all over the world, or, whether, when more urgent need arises, it is done by the instantaneous telegraphic message, once more invention has to be acknowledged with gratitude. The paper, the steel pen, the type, and, now-a-days, even the very setting-up of the type, the electrotype plate, the steam printing-press, all matters in the domain of letter-writing and book-producing, are the offspring of mechanical and chemical invention; while the electric telegraph, from the comparatively coarse covering of the deep-sea cable to the delicate instrument by which signals are transmitted and received, involves a combination of some of the most excellent inventions that have ever emanated from the human intellect.

The foregoing matters may be called the necessaries of life; but the luxuries and adornments are equally under obligation to mechanical and chemical invention. Furniture for instance: the woodwork has been prepared by the strong but simple sawing-machinery, afterwards it owes its form to modelling-machines capable of producing the most exquisite carving. The covering of chairs and couches, the materials for curtains and carpets for our rooms are the produce of the chemical art of the dyer and of the engineering skill of the spinning-machine manufacturer and of the loom-maker. Our windows and looking-glasses are the result of scientific chemical combinations, producing in the first instance a material translucent, but not transparent until it is subjected to a succession of ingenious mechanical operations in which large invention is displayed.

Passing from these peaceful and happy uses of invention, and dwelling for a moment on warlike considerations, one finds that within the last twenty years (that is to say, since the period when the mechanical engineer took up the subject) the art of the gunner and of the artilleryman has become converted into a science; and thus even in the profession of arms acknowledgment is due to mechanical invention.

Not an unnatural sequence to the consideration of the public calamity, "war," is the train of ideas which proceeds from the more private disaster of "fire." In this instance it is by mechanical engineering a supply of water is brought within a few yards of the conflagration; and it is to mechanical engineering that we are indebted for the steam fire-engine, that wonderful concentration of great force within the minimum of space and weight by the aid of which tons of water are poured forth above the highest buildings.

Having thus endeavoured to call to your minds how absolutely dependent we are for every necessary and for every comfort upon invention and improvement, I trust you are prepared to agree with me, that although there may be persons who oppose protection for inventions, there cannot be any who will not admit that we have largely profited by inventions up to the present time, and that it is most desirable inventions and improvements should continue. This being so, let us see whether improvement is more likely to be made with or without a Patent-law.

The opponents of a Patent-law say (among other things) that an ingenious man can no more withhold himself from inventing than a musician can abstain from composing, and that whether the invention is to result in profit or not, the genius must invent, and he will do so, not only in the absence of all pecuniary reward, but even in the absence of the glory which it is supposed might arise from the publication of his invention. I think this is a very unfair estimate of the nature of a really ingenious mind, and also an unfair illustration. The musician composes, perhaps, to gratify his artistic taste, but having composed—which really means having committed his idea to paper—he has done all that any musician could do; for him there is no further step to be taken. A real inventor, however, cannot rest contented with this committing of his ideas to paper; he must see them practically carried out, and above all he must do so if he be of the useful class of inventors—that is to say, a man distrustful even of his very ingenuity, acquainted with the difficulties that arise in practice, and knowing, therefore, how necessary it is that the thought of the mind should be developed into practice, such a man must see his improved steam-boat engine at work on the high seas, his improved locomotive drawing an express train, his improved hot-blast at work reducing refractory iron-ore. A real sound inventor who had no hope of thus perfecting his invention would, in despair, cease to invent, and the inventors who remained would be either the impracticable, visionary men, whose so-called inventions are useless, or they would be persons engaged in manufacture, who would make inventions of detail in their special trade, and, if these inventions were of any real value, would strain every nerve to keep them secret.

The opponents of a Patent-law further say that in its absence inventions would continue, because an inventor would reap his due reward by embarking in the manufacture of his own invention; and they say he would do so on favourable terms, for not only would he have the start of all other persons, and a more intimate knowledge of his own invention than any one else could have, but his would be the best trained workmen, and from these causes he would be in an excellent position as a manufacturer, and his products would have credit with the public.

Those who put forward such a mode of reward appear to forget that commercial success, which must be attained to get the reward, demands, not merely skill of invention, but also capital, business habits, the art of organizing and controlling a staff of workmen, and the equally great, if not greater, art of finding a market and selling to a profit; and also that if the inventor is not living in a suitable locality for the manufacture, he must be prepared to break up his connexion with the place where he may have been for years, involving the surrender of any occupation he might have held there, and must recommence life elsewhere.

And just one word as to his retaining the skilled workmen trained in the exercise of this invention. Would not the very first step in rivalry of manufacturers be the procuring the services of the workmen who had been taught by the inventor? A few extra shillings a week would be a sufficient inducement to secure them and all the knowledge they could impart; and thus the inventor would have the mortification of seeing his workmen taken from him, one by one, as they become competent, and would find himself in the position of constantly teaching beginners, with the certainty that they were to go to his rivals as soon as they had learned enough to be of any service to them.

This is no mere imaginary state of things; it happened in the case of Crompton, the inventor of the spinning-mule. I shall have to refer to him on more than one occasion; but I will say here that when his unpatented invention became public, and he was left to the product of his manufacture for his reward, the spinners in the neighbourhood, not content with tempting away his workmen as soon as they became competent (so that, to use Crompton's own phrase, "he was always teaching green hands"), actually bought over his own sons to become the teachers and assistants of the rivals of their father.

Reverting to the suggestion that inventors can be rewarded by becoming manufacturers, I will consider, first, the case that appears to me most favourable to the success of such a system of reward—that is, where an invention has been made by a manufacturer in some branch of his trade, where he has all the appliances of an established business, so that he can readily make his preliminary experiments, carry his invention into practice if these experiments succeed, and also find a market among his connexion. I will assume, moreover, the invention to be of such a nature that the inventor may have reasonable hopes of carrying it out as a secret manufacture.

I do not know whether those who say it is inexpedient to protect invention have considered the question of secret manufacture, nor whether they are of opinion that the increase of such manufacture is, or is not, to be deplored. To my mind, nothing could be more lamentable in a moral point of view. The proprietor of a secret manufacture lives in constant fear of discovery; he hardly dares to increase his product, because, in doing so, he has to add to the number of persons whom he must trust; he is obliged to pay these persons large sums, not really for wages, but as hush-money, and these payments have to be charged upon the article manufactured, which thus must be unnecessarily high-priced. This limitation of manufacture and the high prices are obviously injurious to the public—the consumers. We have seen that it was worth the while of manufacturers to buy away Crompton's workmen, even when his process was no longer a secret, and when all that his men could impart would be some detail of skill in manipulation; how much more would it be worth the while of manufacturers to buy away workmen who could disclose the actual secret of an improved process? The inevitable result must be a constant tempting of the fidelity of the workmen, temptation which must be counterbalanced by heavy payments on the part of the employer; and thus the workman is put in a false position, which renders it almost impossible for him to preserve his uprightness, and to do his duty.

Sooner or later the secret is all but sure to leak out; and I think I have shown that in most cases it cannot be preserved for any length of time. Thus those who are of opinion that an inventor may derive his reward from the profits of a secret manufacture are, it appears to me, in this dilemma—either the secret is not kept (in which case the profits it might bring are not made, and the inventor is not rewarded), or, if it be kept, workmen are demoralized, production is limited, cost is increased, and the public are injured.

Crompton commenced by a secret manufacture at his house called the "Hall in the Woods;" but he was compelled to give up the secrecy, being unable to support the systematic siege he suffered there. In spite of barricades to doors and windows, his house was literally broken open by men who were truly burglars, for they came there to commit a robbery, the robbery of his invention.

But even if there were no objections to secret manufacture, and it could be carried on without the demoralization and risks of discovery I have shown to be attendant upon the exercise of it, such a manufacture is applicable only to those cases of invention where the improvement is in the means or process, and not in the article produced. A textile fabric, similar in its structure and appearance to those already known, may be better because it is cheaper, having been produced in an improved loom and dyed by dyes the use of which was hitherto unsuspected. In such a case, secret manufacture is to a certain extent practicable, because the mere appearance of the cloth does not reveal by what means it was so cheaply made. As regards the weaving, however, the difficulty of secrecy would be great; but with respect to the dyeing, concealment might be more easy if the improvement consisted in the application of an ingredient which could be added by the inventor himself, or by some one or two persons whom he might trust.

But in the large class of inventions, where the product is an improved one and the very inspection of it reveals the improvement, secrecy is obviously impossible. Let me, as an illustration, refer you to the Giffard Injector. This invention (to which I shall again have to allude) is one applicable to the supplying of steam boilers with their feed-water, and replaces the steam donkey-pumps formerly used for that purpose. The very first mechanical engineer into whose hands one of these injectors came would take it to pieces, and at once ascertain the nature of its construction. In such an instance as this there can be no reward by secret manufacture.

In the case I have assumed, where it may perhaps be possible for an inventor to carry on a secret manufacture, I have taken (in favour of the advocates of such a system) the instance of a man having made an invention in his own trade, and being possessed of every facility for bringing that invention to a commercial result; but I believe it is not among inventors and inventions such as these that we must look for great improvements; the fact is, that the bulk, one might almost say the whole, of real substantive inventions have been made by persons not engaged in the particular pursuit to which these inventions relate.

Take a few instances. Watt was not a maker of steam-engines, the fire-engines of his day, he was a mathematical-instrument maker; Arkwright, the inventor of the "water-twist," was a barber; Cartwright, the inventor of the power-loom, was a parson; Neilson, the inventor of the hot-blast, was wholly unconnected with smelting-operations, he was the manager of a gas-works; Wheatstone, who has done so much for electric telegraphs, was engaged in the manufacture of musical instruments; Ronalds, the very originator of the electric telegraph, had nothing to do with the visual telegraphs in use in his time; and Bessemer, who has so enormously increased the manufacture of steel within the last quarter of a century, was in no way connected with that industry. The fish-joint for railways, the greatest improvement in permanent way that has been made since railways were introduced, was the invention of a carriage-builder. I trust that I have given examples enough to establish my position, that the great substantive inventions are made by persons unconnected with the manufacture or art to which those inventions relate; and we can readily see why this should be. The person who has been brought up to pursue any particular manufacture has, even before he had sufficient knowledge to be able to appreciate the merits and the principles of the processes he was taught to follow, been trained in the belief that certain ends are to be obtained by certain means.

Under such circumstances it is difficult for even a powerful mind to break through the trammels which have been imposed upon it, and to approach the consideration of the subject of the particular art with the same broadness of view, and the like power of detecting and grasping the true principles upon which that art is based, as would be possessed by a mind devoting itself to the subject for the first time; and thus the man untaught and unprejudiced in an art is more likely to make a substantive invention than is one who has been trained in it from his youth.

Improvements of detail such a person may make, but there, in all probability, will be the limit of his inventions.

It is easy to believe that a man who had been taught from his boyhood to make steel by the process of cementation (that is, by packing bars of wrought iron into brick boxes containing charcoal, and exposing the whole for several days to considerable heat, and thus carbonizing the iron and producing blistered steel) might devise some improvement by which this process could be expedited, though it is difficult to imagine such a man breaking with the traditions of the industry, and casting away the whole process of cementation. But one bringing a totally fresh mind to the consideration of steel manufacture would, in all probability, study the question from the very beginning, and would say, "What is steel? What is wrought iron? What is cast iron?" and when he discovered that steel was something between cast iron and wrought (that is, a substance containing less carbon than the one and more than the other), and when he found that cast iron was a cheaper article than wrought iron (wrought iron being commonly produced from cast by abstracting practically the whole of its carbon), would seek a means by which he might take away from cast iron, not the whole of the carbon, to obtain wrought iron, but so much of the carbon as would leave steel.

To one brought up in the steel trade, the very word "steel" would be associated with the addition of carbon, and it would be most unlikely that he should attempt the manufacture by a process which had for its object the taking away of carbon.

Once concede that the great inventions are made by "outsiders," then it appears to me that to continue this, the highest class of invention, protection is an absolute necessity. An inventor must nearly in every case make trials and experiments, and these, as a rule, can only be conveniently done in places where the manufacture is being exercised: but now we are assuming that the inventor is not engaged in the manufacture; he has therefore either to incur great expense to make his experiments, an expense in many cases prohibitory, to forego the experiments altogether, or else he must seek the aid, and trust to the honour of, some manufacturer.

Imagine a country clergyman, who has a knowledge of chemistry, making an invention of an improvement in smelting iron-ore. If he were a man of real ability, as I have supposed, he would appreciate the great complexity and the many practical difficulties of that process, and he would know that nothing short of a trial of his invention in the actual furnace could assure him that his method would not be frustrated by some such difficulty.

What, without a Patent-law, is that inventor to do? Abandon the trial? devote five thousand pounds of the large property which usually belongs to a country clergyman to the erection of an experimental blast-furnace? trust to the honour of a manufacturer? or give up the invention? I think the probability is he would pursue the last course, and that thus the invention would be lost to the community.

But even supposing the preliminary difficulty of a practical trial not to exist. Assume, for example, that the invention be one such as that of the "Giffard Injector" already mentioned, one of the most substantive of the present day. This might have been tried in private by its inventor without insuperable difficulty, even although he were wholly unconnected with any of the mechanical arts, and he might have perfected his invention in every detail. But when he had done this, what would have been his chance of reward? how would he have set about reaping the pecuniary benefit which he would desire, and which would be his reasonable due? Would he make up his mind to change all his usual habits of life and to become a manufacturer?

Say that he did so, and that, in spite of the difficulties to which I shall have to revert, he succeeded in making a certain number of the injectors for sale, and that he then knew enough of business to obtain purchasers for them, what would be the inevitable result? As I have already said, when taking the instance of this implement as one impossible to make the subject of a secret manufacture, the very first mechanical engineer (a steam-pump maker) into whose hands one of these injectors fell would say, "Here is an implement that appears likely to compete seriously with the use of steam-pumps. Why should not I make it?

At present I know it is being manufactured by the inventor only, a person who was not brought up to trade, and who is living in a purely agricultural district; it is a hard case if I cannot hold my own against him."

Thereupon, the steam-pump maker goes to work, with all the advantages of an established factory, with its befitting plant, its staff of superintendents, its foremen, and its body of workmen, to produce injectors, and with a whole system of travellers and agents, and the advantage of a large connexion, to dispose of the injectors when made.

What chance would the inventor have, in his capacity of manufacturer and seller, against such an organization as this? Obviously none; therefore, as it seems to me (equally obviously), he (foreseeing this) would not have bestowed the thought necessary to invent, and even if he had he would not have incurred the labour and expense of experimenting upon his invention.

Having shown (as I trust I have) that in those cases where the invention is one that could be exercised by the inventor, his chance of profit, in the majority of instances, would be but small, even if he could carry on a secret manufacture, it is almost surplusage to show, as I am about to do, that there are numerous instances in which (whatever might be the position of the inventor as regards command of capital, business habits, and residence in an appropriate locality) it would be impossible from the very nature of things for him to reap an adequate reward.

Take the case, again, of the fish-joint on railways. This great improvement requires for its carrying out, at each joint, only two bars of iron and four bolts and nuts. These can be produced at every iron-works in the world without the exercise of any unusual skill or intelligence; they are mere common articles of manufacture, yet when applied to rails in the way directed by the inventor (a way which, after years of study of the question of how to improve the admittedly defective railway-joints, no engineer ever thought of) it makes an attachment which has added to the life of permanent way and of rolling stock, and has contributed in a great degree to the comfort of the traveller.

Take an instance of another kind, one wherein the invention does not consist in a simple "application" of a common article of commerce, but in a "process," say the Bessemer Steel Manufacture. Notwithstanding the trammels of a Patent-law (as the opponents of such laws would say, or rather aided by the provisions of such a law, as I should say) the Bessemer invention in 1873 produced in England alone 400,000 tons of steel, while in 1851 the total production of cast steel was but 30,000 tons. It seems to me fitting that one who has so far benefited manufacture and commerce should have a large reward.

By the aid of a royalty it was possible for Bessemer to obtain, by a small percentage on the price of all steel, a substantial reward; but I do not see how this could have been secured to him by the profits derived from being himself the manufacturer of that which, even on the largest development of his works, could only have been a small fraction of the whole. The very magnitude of the results of his invention would be a bar to an adequate reward, unless that reward were spread over the whole manufacture.

There is one other class of inventions, the nature of which renders it impossible for the patentee to be adequately rewarded (even under the most favourable circumstances) by manufacture. I will instance the Regenerative Furnace of Dr. Siemens. This furnace (of which there is a diagram on the wall) has for its object the saving of fuel and the attaining of high heat. Laudable objects these. Let us see how Dr. Siemens secures them. He makes a large chamber, called the "Producer," capable of holding, say, three or four tons of coal or coke. At the bottom of this chamber there is a small fire-grate, immediately above which a portion of the fuel is undergoing combustion in the ordinary manner. The heated carbonic acid resulting passes up through the fuel, takes up carbon from it, becomes converted into carbonic oxide, and escapes (with any hydro-carbon that may have been driven off by the heat, if the fuel be coal) through an ascending pipe, and is led away by mains to any place where a Regenerative Furnace is to be in operation. The Regenerative Furnace has below it two pairs of stacks of cellular, or pigeon-hole, brickwork. Through one division of one pair the gas from the Producer is ascending, through the other division of the same pair atmospheric air is also ascending; the air and gas meet in the chamber of the furnace, combustion ensues, and heat is developed. In an ordinary furnace the heated products of combustion escape into the air by a chimney, and, as they must leave the furnace at a higher temperature than that at which it is necessary to maintain the material under operation (or otherwise they would cool that material), the products of combustion of ordinary furnaces must, in all cases where high temperatures are necessary, carry into the air and waste a large amount of heat. But in the Siemens furnace these outgoing products are compelled, on their way to the chimney, to pass downwards through the two divisions of the second pair of blocks of pigeon-hole brickwork, and in their passage they give up their heat to this brickwork so effectually that, although they may have been issuing from a furnace above the temperature of melted steel, they will, on reaching the chimney, not have heat enough remaining in them to char a piece of wood. At the end of a certain time, say half or three quarters of an hour, valves, which control the direction of the currents of gas and air and of the outgoing products of combustion, are shifted, and the gas and air are now caused to ascend through the pair of masses of cellular brickwork which have just been heated by the outgoing products of combustion, while those products are directed downwards through the other pair of cellular structures, which have been cooled by the passage through them of the gas and air, and thus are fit, being cool, to take out from the products of combustion the heat which is in them, and to store it to heat up the gas and air when they, on the next reversal of the valves, again pass through them.

The success of this plan has been complete; the advantages in economy of fuel and in the capacity to give high heat have been all that could be desired. Moreover there are large contingent benefits, into which I will not now enter. No one will dispute that this is a most meritorious invention; it saves our coal, and it renders possible certain processes which, with the temperatures formerly attainable, could not be carried out. But how, in the absence of protection for invention, could Dr. Siemens have derived any adequate reward? Not by practising his invention, for that, from the very universality of its application, would have been an impossibility. His furnaces are used by the manufacturers of wrought iron, by the makers of steel, by the producers of plate and flint glass, by enamellers, by copper-smelters, by nail-makers, potters, and by those engaged in numerous other branches of industry requiring furnace-power.

I should like to ask the advocates of the system of rewarding inventors, by letting them carry out, as manufacturers, the objects of their invention, whether they would suggest that Dr. Siemens should embark in all the businesses to which his invention is applicable. They might say, "No; we never intended any thing so absurd. His invention is a furnace, and he should embark in the manufacture of furnaces, as the inventor of an improved loom should embark in the manufacture of looms." But the answer to this would be, a loom is a self-contained machine, that may be manufactured in one place and may be conveyed for sale to another, and it is an ordinary article of commerce; but the Siemens furnace is not self-contained—it is not portable. The furnace demands nothing more for its construction than the employment of ordinary materials set in a particular way, the way of the invention, and any intelligent furnace-builder to whom a drawing of the invention is shown, or who has seen one furnace, could build another.

I will now consider another class of cases, those cases where the inventors are poor men, and where, therefore, it must be admitted that whatever advantage they may have of locality, or even of business habits, they lack the greatest of all aids to prosperous manufacture—capital. How can these men, by becoming manufacturers of that which is the subject of their invention, obtain a fair reward for their ingenuity? It is said by the opponents of a Patent-law, let such men go to capitalists, explain their invention, and thus obtain the aid that wealthy men can give. What would be the result? The capitalist would say, "Why should I embark my money in perfecting an invention, and putting up suitable machinery for its manufacture, with the certainty that if it turns out a success I shall have the whole trade in competition with me, and competing on better terms than those under which I should be working, because they would stand by to watch my results, and would wait until I mastered all difficulties? You are asking me to run a special risk to reap (even if successful) no more than the reward of ordinary manufacture. Moreover I don't wish to trammel myself by associating with you in business, and I cannot pay you a sum of money, because I I have no security that you will not go and re-sell your invention to others."

But suppose the invention were one that afforded reasonable grounds for believing that it might be carried on by secret manufacture, that the inventor were to point this out to the capitalist, and that he were inclined to embark in that most unsatisfactory kind of business. What security has the inventor that after he has communicated his secret to the capitalist, the latter will not abuse the confidence that has been reposed in him, and either take the invention without any reward, or with only a very inadequate reward? A man can often contrive to act in such a manner without wounding his conscience. He goes to his foreman, or he consults a friend, and these tell him, "Oh, there is really nothing new in this; twenty years ago the same idea (I don't mean, you know, to every detail, but practically the same idea) occurred to me, and I should have carried it out, only the condition of the trade at that time did not warrant my going into fresh expenses; there really is nothing in this, except the bare detail, beyond what we knew before;" and so the inventor is shown to the door, and the confidential communication is abused.

I may be asked, Why are you to suppose knavery of this kind? why not assume that the majority of mankind are not only honest in the legal sense, but that they have a feeling of honour which would not permit them to act as you have suggested? What warrant have you for believing that inventors might not trust others with their secrets? Again I refer you to the life of Crompton. After the trade had (as I have told you) laid siege to his house, and kept him there barricaded and all but a prisoner, he was so wearied out that he proposed terms to his persecutors. He would reveal his secret to them if they would undertake to pay him a certain sum of money on his doing so. Many "honourable men" agreed, in writing, to pay him the sum set against their respective names, sums varying from one guinea to five shillings, and making the magnificent total of £106! Crompton kept his part of the bargain; he met his honourable fellow townsmen, showed them the machinery, explained every thing; and what happened? Out of the number who had made this bargain with him, many never paid one farthing, but, furnished with the information, at once went to work in competition with Crompton, and (after having broken the eighth commandment by stealing his invention) proceeded (as I have told you already) to break the tenth by coveting their neighbour's servants; and, as is usual, they did not stop at coveting, but they enticed them away, and they made their temptation so strong that even Crompton's own sons deserted him and went to his opponents.

How different is the condition of the poor (comparatively poor) inventor who avails himself of our Patent-law. For a few pounds he can get provisional protection, and the moment he has it he has possession of a property which the law secures to him as effectually as it secures the enjoyment of house or land. Armed with this right he can go to the capitalist, not only without fear that his confidence will be abused, but with a strong inducement to the capitalist to advance his aid. There is no longer a dread that when all the expense has been incurred to perfect the invention, and to bring it into actual use, the benefit will be reaped by others without special reward to those who between them have made the invention and have risked the money to work it; and thus it is that we find inventors aided, as Boulton aided Watt, and from such aid the happiest results flow.

I remember that a gentleman who had made a most meritorious chemical invention, by which a substance that had always been considered as nothing but a waste product of the most offensive kind became converted into a highly valuable article of commerce, stated before Section F of the British Association at Exeter that he had required an outlay of £10,000 in order to test by actual trial whether or not his invention, successful as it was in the laboratory, would be equally so in actual work. He added that he was as unable to find £10,000 from his own resources as he was to pay off the National Debt; but he was able to find money enough to obtain the protection of the law for his invention, and having got this he submitted his plans to a capitalist. He advised that capitalist to call in the highest chemical assistance; for the inventor, protected by his patent, no longer required secrecy, on the contrary he courted the fullest investigation. The chemists examined, they reported favourably; the money was advanced; the whole thing was a success; and now, added the speaker, I find myself a comparatively rich man, and have beside the satisfaction of knowing that I have caused one of our manufactures to make a most important step.

I have, by a few typical cases, exposed (at least I trust I have) the fallacy of those who say the inventor, in the absence of any Patent-law, would still invent for the hope of reward, because he might reckon on gaining that reward by becoming the manufacturer of that which he had invented: but there are other opponents of patents who do not hold forth a hope of gain in this way; they say, a wise and beneficent Government should reward the "citizens who have deserved well of their country." I believe I have caught the language of the formula. I don't think these men talk about fellow-subjects of the Queen. However this may be, they gravely propose that a portion of the revenue of the State should be adjudged each year to meritorious inventions. I find it difficult to treat such a proposition as this seriously, but I suppose I must do so.

Let us see how it would work. What inventions should be rewarded? None but those which had come into actual use, or, in addition to these, inventions which were only just published? If the former, how deal with objections that would be urged by a host of men who would spring up to allege that the man who put himself forward as the first inventor was the merest visionary, and that had it not been for their real practical skill the whole thing would have remained a useless scheme? Moreover, as I shall, I hope, hereafter show, years in all probability would elapse between the publication of an invention and its adoption if there were not protection for inventors; and in this way the unhappy inventor might be dead or in his dotage, worn out by hope deferred, before the reward was adjudged to him, even if it were ever so adjudged, looking at the competition of pretenders that would be sure to arise. But take it, to avoid this delay in compensating the inventor, it should be in the power of the tribunal to give the reward to originators of untried inventions, only imagine the cloud of schemers, both in and out of Bedlam, who would commit their crude conceptions to paper and send them to the tribunal, confident that they must get the reward. By what possible machinery could such a tribunal act to investigate novelty, degree of merit, and practical feasibility of inventions that had nothing but a paper existence? I believe that in their despair and disgust many men of intelligence and character who might have been on such a tribunal would retire from it, and that it would degenerate into a clique for perpetrating the vilest jobs.

Fancy the pressure brought to bear on the committee by the member for some borough who has been assured by half a dozen of his constituents that their "talented townsman" Mr. Smith is a most meritorious inventor, that he has designed a machine which, on being worked by one man, succeeds, through an arrangement of leverage and the aid of a screw, in giving off as much power as has been estimated to be equal to a good 10-horse engine. Models have been tried which conclusively proved that if (there is always an if) they had been properly made these results would have been fully attained. I may perhaps be told there must be on the committee men of sufficient sense to detect the ridiculous character of such statements as I have suggested; but in some cases I should be very sorry to abide by the opinion of any body of men, in the absence of trial, whether an invention could succeed in practice or not. I will give you an instance. Next to Earl Dundonald, one of the earliest inventors in the art, now so extensively followed, of sinking cylinder foundations, was Dr. Potts. He published an invention in which he told you that if you placed a cylindrical hollow cast-iron pile with its open mouth upon, say, the gravel bed of a river, and if you covered the top of the pile, and then exhausted the air from its interior, the pile would penetrate the ground, and would do so although, from the nature of the soil, it would be all but impossible to get the pile down, even a short distance, by the heaviest blows that could be given to it by a powerful pile-driver. Dr. Potts was right in this; but, in the absence of experiment, would not the members of the Inventors' Reward Committee have come to the conclusion that the Doctor was a visionary, and that his invention could be proved to be chimerical? Would they not have said that, in the instance of a pile of a foot in diameter, the utmost pressure that could be got upon it by the exhaustion of the air, even in the impossible event of a perfect vacuum, would not be quite three quarters of a ton, that in practice it would not be more than half a ton, and that such a force, a statical one, must obviously be far less powerful than the effect of a ton weight suffered to fall on the pile through a drop of several feet, and that thus Dr. Potts's exhaustion plan could not send the pile down at all, or if it could, the pile, when down, would clearly be unable to support any load worth speaking of?

But those gentlemen who thus would have withheld all share of the national reward from Dr. Potts, on the ground that his invention must be useless, would have been wrong; for the fact is that Dr. Potts's plan, although it only imposes on the head of a one-foot pile a pressure of about half a ton, does send such a pile down into soils which offer so much resistance that the pile when thus driven will support many tons without the least yielding. It being a fact that the pile did go down, and equally the fact that the mere pressure of the air upon its top was wholly inadequate to account for its being driven, attention was directed to the subject, and we now know that the pile descended in consequence of the removal of the soil from below its bottom edge, the removal being caused by the rush of water into the exhausted cavity of the pile.

It appears to me the suggestion of rewarding inventors generally by Government grants is an absolutely impracticable one, and that it never could be successfully carried out. There have been some particular instances of this mode of reward. I will only allude to one; and again it is Crompton to whom I wish to direct your attention. After years of the disappointment and loss to which I have referred, and after not only his townsmen and neighbours, but the kingdom itself had become enriched by the general adoption of his invention (there being between four and five million spindles at work), some persons in his neighbourhood backed up a memorial he presented to the ministry of the day, and, after much discussion, Government awarded to Crompton the munificent sum of £5000! and thus, at the age of 60, after having devoted thirty years of his life and all his property to the advancement of his invention (one of the very greatest that has up to the present time been made in the spinning of cotton), he received a sum equal to a stipend of £75 a year paid to him throughout those thirty years. Probably among those who supported Crompton's memorial to the Government were to be found some of the honourable men who did not pay their promised subscriptions; perhaps their consciences had become clamorous, and it had occurred to these gentlemen that a cheap way of quieting the clamour would be to make the nation discharge their private obligations—thus reminding one of the definition of charity, that A never sees B in want without feeling a strong desire to relieve those wants out of the goods of C.

If a system of national rewards were instituted, I am certain that the sums to be awarded must be wholly inadequate to compensate the really meritorious inventor, who thus would not be tempted by them to invent; that if awards were not to be made until commercial success had certified to the value of the invention, reward would be delayed and would be frittered away among numbers; that if untried inventions were to be rewarded, good inventions might be rejected, because, as in

Dr. Potts's case, they would not be understood, while the whole host of pure visionaries would be encouraged; and, finally, that the invention which was supported by the most plausible and persistent advocacy, whether of the inventor or of his supporters, would obtain the prize that should be given for real merit only.

I now come to the last class of reward suggested as being sufficient to secure new inventions, and not mere inventions, but inventions carried to practical result.

This class, if rather shadowy, is cheap; it is honour. The meritorious inventor who has "deserved well of his country" is to be rewarded by some honorary distinction. A statue, a tablet, a public recognition in his town-hall, and an address from the Recorder, or something of that sort; and, moreover, after such public recognition, the honoured inventor, as he went along, would hear, "Look at that man; he is the great, the celebrated Mr. Smith, who invented—what? —if the steam-engine or the electric telegraph, the phrase used might be understood and command respect wherever civilization extends; but there are many great and most useful inventions, which relate to manufacture, having technical terms—terms which are absolutely gibberish to those outside the trade, or if they convey any meaning at all, convey an erroneous one and frequently an absurd one.

Once more take Crompton. There goes the man who invented "the Mule;" that does not sound very well. But the mule itself has details; one is "Twist at the head." Imagine a man being introduced into London society as the inventor of "Twist at the head," a pretty burden his life would be made to him! Imagine Stephenson's claim to respect and attention being based upon his improvement of the "Gab Motion." It would be an unpardonable waste of your time to multiply examples. Moreover, statues, even if good, and public addresses, though eloquent, would not pay our taxes nor find us in clothes. I feel that in this room I ought not to undervalue honorary rewards. Its walls are adorned with pictures showing that, in times gone by, competitors were content with the applause of their fellow men, or at the utmost a crown of leaves satisfied all their ambition; but I doubt whether those ages produced many inventions, except improvements in weapons to enable man to more conveniently kill his fellow man. Further, in those golden ages and genial climes, I think we may take it men were but lightly taxed, and certainly the tailors' and dressmakers' bills (to judge by the representations on the wall) must have been at a minimum. Under such circumstances men might be content with honorary rewards; the hard realities of our times and our climate, however, make such rewards, alone and unaccompanied by something more substantial, a mere mockery of the need that they were destined to cheer. For the last time I will refer to Crompton; he, or rather his spirit, has had honorary reward. Long after his death the town of Bolton erects a statue to his memory; there was an unveiling, there were speeches. The opponents of a Patent-law might say, "What more can a man want, to cause him to devote his life to improvement, than such a posthumous reward as this?" In answer to such a demand, I think the inventor would refer the opponent of a Patent-law to Shakspeare. What says he of honour?

> "Who hath it? He that died o' Wednesday. Doth he feel it? No. Doth he hear it? No. Is it insensible, then? Yea, to the dead. But will it not live with the living? No. Why? Detraction will not suffer it, therefore I'll none of it."

Among all the papers on the Patent-law that I have read, and among all the discussions on that question I have attended, I do not recall any other suggestions put forward by the opponents of Patent-law, as affording adequate grounds for the continuance of invention in the absence of such a law, than those I have now considered:—1st, that an inventor cannot refrain from inventing; 2nd, that the inventor is the man who of all others can best reap a profit from the commercial exercise of his invention; 3rd, that there should be a system of national rewards; 4th, that there should be a system of purely honorary rewards.

I can have left you in no doubt as to my opinion of the inadequacy of each and all of these suggested incentives to invention, and I will trust that most of those who honour me by their presence here to-night concur in my views; but there are men who say, "Be it even as you state, and take it that in the absence of a Patent-law there will not be an adequate incentive to invention, still it is expedient that such a law should not exist, because greater evils arise from it than would arise from a cessation of invention."

They say the evils are:—

Interference with freedom of trade.

That British manufacturers are put at a disadvantage as compared with those of countries where there is not a Patent-law.

That a patent for an invention, by barring the road, stops further invention.

That patents are granted for useless things.

That patents are granted for things which are old.

That the existence of patents gives rise to expensive and difficult litigation.

That patentees are great losers by patents, and that it would be a charity to protect them against themselves.

Let us, as briefly as possible, examine into the value of these charges.

"Interference with freedom of trade." This, I admit, has a solemn sound; it is enough to cause many wise heads to be shaken: but don't let us be frightened at an expression; let us examine and see what it means.

Some forms of words are very startling when heard for the first time.

Let me give you an instance. Within the month a letter was written to the 'Times,' by a person using the initials "F.R.S.," entreating that the 'Devastation' should not be sent to sea, as she must be unsafe because she had "heavy weights above her centre of gravity." This is a most alarming statement until it comes to be considered, and then it turns out to mean no more than that the 'Devastation' is not a floating miracle, as she must have been if she were the first body in creation that had not as much effect from the weights above its centre of gravity as from those below it.

Now, as to interference with freedom of trade. It is said, were it not that the inventor blocks the way with his patent, manufacturers generally would use the invention, and thus the public would be benefited. I unhesitatingly assert, as the result of many years close attention to this question, that such a statement is entirely at variance with the facts; and before I have done I hope you will agree with me.

Take any one of the important industries, industries such as cotton or wool. The very last thing the established manufacturer wishes for is a substantive improvement, and for the following obvious reasons:—He has got his good business and his connexion; his customers are pleased with that which he makes, and are satisfied with the price they have to pay for his production because they have no experience of any better quality or of any more advantageous price, inasmuch as, by the supposition, this manufacturer is a man doing as well as the bulk of those in his trade. He, his foreman, and his workmen are all accustomed to their own way of work, and they don't want to learn a fresh system. But there is one reason of far more consequence than all these together, and that is, the manufacturer has many thousands of pounds embarked in the machinery with which he conducts his manufacture, and that machinery being in profitable use is of the full value at which it stands in his books; but compel him to adopt a substantive invention in his manufacture, what will then become of those thousands of pounds worth of machinery? They will lose their worth at once, they will be degraded from their condition as machines to the state of old metal, and their value will fall from many thousands to perhaps not the same number of hundreds; and contemporaneously with this fall will be the necessity of finding a large sum to be expended on the machinery required by the new process. Coupled with this there is the annoyance of partial stoppage of works during alteration, of bad work being produced for some time under the new process, because it is new and has to be learned, of the chance of offending customers by delay and by the inferiority of products arising from the bad works of which I have spoken; and all this has to be incurred in the hope of success by the new process, with the certainty that, directly it is found to succeed, competitors in trade will one by one follow the example, leaving the adopter of the new method no better off in comparison with his competitors than he was before the alteration, and with the certainty that if the plan fails, even if he be not ruined, he will be laughed at for his pains. Moreover, there is not only the difficulty of teaching men new ways, there is also to be overcome the frequent exhibition of sullen ill-humour which breaks forth when a proposition is made to some trusted and honest, but narrow-minded, manager or foreman, that the process he has so long followed can be improved. What is the "consecrated" expression used under such circumstances? "Here have I been working, man and boy, for forty years at this work, and my father before me, and I am to be told that some man, who is ten years my junior and who never worked at the trade at all, knows more than I do, and can teach me my own business." This is a dire offence. I have seen much of it, and it has practically a greater weight than might, on a first consideration, be attributed to it. Remember that frequently the principal of a manufactory has to rely on such men for all questions connected with the manufacture, and that even in those cases where he knows enough of his own business to be able to judge for himself, the amount of resistance to improvement that can be offered by men of the class I have been considering is most serious; and they can offer such resistance, covertly and passively, without the possibility of their employer being able to fix them with an absolute disobedience of orders or with an active opposition. I will ask you to let me give two instances. One occurred about five and twenty years ago at a Government victualling-yard, when an improvement in grinding wheat was being tried by the Government, at the cost, as I need hardly say, of the patentee. The improvement, if successful, as it was, would have lessened the hard work of the men, but beyond that would not have interfered with them or their foreman in any way; and yet in this case there was a great amount, not of mere passive, but active resistance offered. An inquiry was demanded and was held; it resulted in some of the offenders being discharged, while others were reprimanded. In this instance, men in government employment, where they might have counted on being retained during their working life and pensioned in their old age, risked and forfeited these advantages, and for no other cause than that their self-love was injured.

Another instance, much more recently, relates to the introduction of the Siemens furnace into a large works. This was met with covert opposition by the foreman of the department, who used to report adversely of the furnace generally, while admitting that at times it would work well. The principal having privately made his own observations, and satisfied himself that the furnace would work perfectly if it had fair play, called his foreman and said to him, "You say the Siemens furnace works well sometimes. Now the furnace is not varied in construction; therefore when it does not work well it must be because it is not properly managed. The management is under your charge, and if in the course of the next three months you cannot manage it so that it shall work well at all times I must get another foreman who will see that it does work well." The furnace worked well from that day.

I trust I have given you reasons enough and to spare why a prosperous manufacturer, instead of seeking about for changes in his manufacture, looks upon all innovation with dislike, and wishes that, so far as his trade is concerned, "finality" may have been reached. Pardon my using a coarse but expressive phrase, which is, that you want somebody to "thrust improvement down the throats" of manufacturers. A patentee is in the position to do this. He has his patent. Very likely he is not a manufacturer; his capital is not embarked in machinery adapted to an old style of things; he has every inducement to devote his time to persuading some one that his invention is valuable, that it will turn out so on trial; he offers to superintend all the experimental work, and thus to relieve the manufacturer from the loss of time and from the neglect of his trade which must ensue if he himself or his staff have to work up an invention to the practicable stage; and then, provided with his patent, he can make an agreement with the person who first tries his invention, to the effect that if successful that person shall be rewarded by a share in the patent or by being allowed to use the invention free of royalty or at a reduced royalty. By this means a patentee does frequently succeed in getting his invention put to work by the manufacturer; but all these means are needed to obtain this end, and even with their assistance it is commonly a work of years before an invention is taken up. When taken up, and when proved a thorough commercial success, then, indeed, under the pressure of the competition of the improved process, other manufacturers may wish to work the invention, and, finding themselves unable to do so except on the payment of a royalty, may raise the cry, "Patents interfere with the freedom of trade." But is this so? What freedom has been interfered with? The industry as it stood before the invention is as open to them all as it ever was, but the power to exercise the invention itself cannot be had without payment of a toll. How are manufacturers damnified by this? Suppose the inventor chose to carry on his process as a secret manufacture, it cannot, I presume, be contended that such a course, however undesirable, should be made illegal; and if not, those manufacturers who had not the secret would be unable to pursue the manufacture. Would anybody seriously call this "Interference with freedom of trade?" Assume that a landowner were to go to a number of manufacturers in his district and were to say to them, "There is a large and unfailing supply of water on the other side of that hill. I have had the levels taken. I have consulted geologists, and I am convinced it is practicable to make a tunnel through that hill. If it were made you would bring here a water-power which would save each of you a thousand a year in the cost of coals you now use for your steam-engines. I should be willing enough to make the tunnel had I the money to spare. I have not; but the water and the hill are mine, and I will contribute the water and give a right of way through the hill as my share towards the realization of the plan if you will subscribe among yourselves the necessary funds; and when the work is completed I shall expect to participate in the profits." Suppose the majority of the manufacturers turned a deaf ear to this proposition, did not believe in it, looked upon it as hopeless that a tunnel could be made through such a rock, dreaded the great cost of water-wheels, and were afraid of finding the value of their steam-engines reduced to that belonging to discarded machines. Suppose, I say, the bulk of the manufacturers addressed pursued this course and refused to aid in the work of bringing the water to the district, would it be for them to raise the outcry of "Interference with freedom of trade?" or would such an outcry be just when those of their body who, in conjunction with the landowner, had succeeded in overcoming every obstacle, and in bringing the water-power to their side of the hill, were to refuse to let those participate in the benefits who had not helped in the works? These men might truly say, "Your trade is just as free to you as ever it was. We have taken nothing from you, but we have by our own skill and at our own risk changed the conditions of our manufacture for the better. We can obtain power cheaper than of yore; but our refusal to let you share in it is simply a refusal to give up that which is our property." If such a refusal as this is to be called "Interference with the freedom of trade," then every man who carries on a manufacture where he gets water-power for nothing, if he refuses to share that power with his competitors in the neighbourhood, interferes with the freedom of trade; and every merchant who has a wharf which gives him better access to a navigable river or to a canal interferes with the freedom of trade, unless he shares his wharf with his rivals. Such propositions one says at once are absurd, and could only be tolerated in a society of advanced Communists. But I confess I fail to see how the proposition that the use of an invention should be open to all is not as rank communism as the condition of things I have assumed.

The second of the alleged evils is, "That British manufacturers are put at a disadvantage as compared with those of countries where there is not a Patent-law."

What is the practical answer to this? Great Britain, the United States, and France all have efficient Patent-laws; and must it not be admitted that in no other countries are manufactures so vigorous or improvements so rife? Few countries claiming to be civilized are without a Patent-law. Switzerland has none. Holland has recently given up her Patent-law. Are these countries of progress, or countries of invention? What do they do to advance manufactures? I once heard Lord Houghton say, at a discussion on Patent-law, when the absence of a Patent-law in Switzerland was cited, that he never heard of Switzerland being famous for any manufacture beyond alpenstocks and long hotel bills. So far from the existence of a Patent-law putting the country which possesses it to a disadvantage, it is the means of causing ingenious foreigners to bring to that country their various inventions which, did they cease to become property when they reach its shores, they would withhold and would keep in their own land. Not only does a good Patent-law bring in foreign inventions, but it attracts good men to come and reside amongst us and to establish works in our country. A distinguished man, whose inventions I have referred to this evening, said, on the occasion of a discussion on Patent-law in Section F of the British Association, that he left his own country to settle here, mainly because the Patent-law of that country was so defective he could get no adequate protection for his inventions. That gentleman, Dr. Siemens, is a naturalized Englishman; he has vastly improved many of our manufactures, and he is at this time an employer of some thousands of workmen, and is so in manufactures which have to a great extent arisen out of his inventions.

The consideration of such facts as these makes it clear to my mind that a good Patent-law attacts improvement to a country which possesses it, and that therefore the manufactures of that country, instead of being placed at a disadvantage as compared with those of countries which have it not, are much more favourably situated.

The third charge against a Patent-law is, "That a patent for an invention, by barring the road, stops further invention."

This I say, unhesitatingly, is contrary to all experience. Progress in an industry may be dormant, as it was for years in the steel trade. At last an original mind comes and makes a great improvement. After a longer or shorter time, dependent on various circumstances, this improvement develops into commercial facts and excites general attention. The immediate result is that a nnmber of other ingenious men are set thinking of the special manufacture, and there follow forthwith a large number of inventions in relation to it.

It may be said, What good is this if the invention cannot be used because the first patentee is there barring the road?

The answer is, that this inventor has not got, and the law will not give him, a patent for all modes of obtaining his end, but only for his special mode, and that all inventions of improvement which do not clash with this can be freely used. And further, that if the subsequent inventions be for improvements upon the mode of the first patentee, the practical result, in nine cases out of ten, is that the first patentee and the subsequent improver come to terms and work their inventions in common.

The fourth and fifth charges are, "That patents are granted for useless things, and also for things which are not new." In some instances this may be so; but who, except the foolish patentee, suffers? In the first place, if the subject be not new, or be not useful, the patent, if not void, is voidable. In the second place, no one wants to use that which is useless, and everybody makes use of that which is old.

The sixth charge brought against a Patent-law is, "That it gives rise to expensive and difficult litigation." This, no doubt, is true; but to what extent? To ascertain the value of the fact, when considering whether or not it forms a sufficient ground for the abrogation of the law of patents, one should examine as to what proportion the litigation bears to the magnitude of the subject. As I have already pointed out, there is hardly an industry in the kingdom which does not employ in several of its branches patented processes and machines. The annual value of their products must be enormous, and must form a very large percentage of the value of the total mercantile and commercial transactions of the country. It appears that rather more than 5000 actions and suits are tried and heard each year in the superior courts of common law and equity; while in those courts 18 proceedings only relating to patents are commenced, and that 8½ only out of these 18 are pursued to a primary decision: thus, notwithstanding the magnitude of the interests involved, and the alleged incentive to litigation arising out of the nature of patents, the number of proceedings initiated is only one third of one per cent. of all other actions that are tried and heard; and the number of patent cases in which a primary decision is given is only 8½, or one sixth of one per cent.

I do not say there may not be instances where persons have been most improperly put to heavy expense in maintaining their rights against patentees by whom they have been unjustly assailed; but is not this true of every other right which is guarded by a law? Yet no one suggests that thereupon the remedy is to do away with the law and the right together. Endeavours are made to amend the law; and if this cannot be done, the chance of cases of hardships is submitted to as being the price to be paid for a law which is for the general good, and, as a rule, contributes to that common good.

From my boyhood, until within the last year or two, certain houses at the corner of Stamford Street were shut up, and were allowed to go into decay, and, with their shattered windows and broken shutters, to disfigure the street, seriously affecting the value of the opposite and adjoining property. Here was a case of individual hardship upon the neighbours; but it was the result of a general law, which gave the control of the condition of houses (so long as that condition was not dangerous) to their owners; and no one suggested that because under such a law this mischief could be wrought, the law must be abolished. The law was a good law, but being human, was imperfect, and might be, and in this instance was, abused.

Again, we are not, even now, suffered to forget the "Claimant" and his pretensions. This was an instance where, under the operations of laws which enable a person to recover possession of an estate from which he has been displaced, a low adventurer had it in his power to harass the rightful owners of a property by years of litigation, and to put them to an expense said to amount to over a hundred thousand pounds, to say nothing of the nearly equal expense to which he has put the nation; and all this without the slightest foundation for his claims. Here was a case of the grossest individual hardship; but no one dreams that because a fraudulent claim was made to an estate, property in estates should be abolished, or even that it would be wise to prevent the repetition of such an attempt at the cost of being without any law by which a rightful owner could recover property that was withheld from him.

The last statement made as to the evils of patents is, "That patentees are great losers, and that it would be a charity to protect them against themselves." That patentees are, taken as a whole, losers by the time and money they expend upon their inventions is, I think, likely; but we are considering whether the community as a whole is a loser. If we are to make classes, and to divide the population into those who take out patents and those who do not, I say the community as a whole is largely benefited. The amount received in royalties from successful patents would, possibly, if thrown into a common fund and distributed over all the patents that are taken out, give but a very poor return to each—a return so poor that it would not be worth while for persons to take out patents if that were to be the utmost measure of their reward. But surely the general public ought not to complain of this; they get all the intelligence, the invention, and the labour of patentees as a body for a confessedly inadequate remuneration; and they get it at this cheap rate because the reward is not uniform, but is varied—so varied that the high prizes are worth the efforts of the best men. Sydney Smith has told us, in his letters to Archdeacon Singleton, on the Ecclesiastical Commission, that if you wish to get the best services at the lowest rate of remuneration, you must do so by making that remuneration unequal. He says:—"It seems a paradoxical statement; but the fact is that the respectability of the Church, as well as that of the Bar, is almost entirely produced by the unequal divisions of their incomes;" and he goes on to show how men of capital and of education are drawn towards both professions by the hope of the prizes, while if the total gains were evenly distributed, there would be no adequate inducement to cause any man of position to enter either profession. So it is as between the great bulk of the public and the inventors; the inventors are tempted by the few prizes, and the public thus get their inventions as a whole at the cheapest possible rate.

The public, as I have said, are benefited, the national revenue is benefited (for the State get as much as £90,000 per annum from patent fees), and the inventors are contented; if they do not get solid gains, they live in hope; and I think it is not too much to ask that, so far as their interests are concerned, it will be time enough to do away with a Patent-law and their hopes together, when the inventors as a body come forward and demand the destruction of both.

I will say no more in support of my two propositions:—The first, that in the absence of a Patent-law there would be no adequate incentive to the continuance of invention; the second, that the Patent-law is unaccompanied by any evils such as would justify its abrogation.

I may be asked, if these propositions be true, why is it that the question of the withdrawal of protection for inventions is from time to time brought forward, while it is rare to find a paper written to express satisfaction with the existing state of things?

In answer to such questions, I would remind you that contented men don't discuss; persons don't run about proclaiming their content. It is the man desirous of change who makes himself heard; and further, I would ask, who are these men desirous of change? Not the inventors, that is clear; and I will undertake to say not (with very few exceptions) the manufacturers. Who are they, then? They are generally men who (with the best possible intentions) occupy their leisure in schemes for the improvement of society. Able men, honest men, and men capable, as a rule, of arriving at just conclusions when reasoning from sound premises. But it behoves such men to be extremely careful. The very position and ability that enable them to do much good when they are right, make it inevitable that they do infinite harm when they are wrong; and they are wrong if they rest their arguments upon inadequate information: and I believe it to be extremely difficult for them to obtain the necessary data; for, as I have said, they are neither inventors nor manufacturers, and therefore they have not that thorough acquaintance with the manner in which, in actual practice, inventions are originated and developed, and with the manner in which such inventions are incorporated into commercial pursuits, that should be possessed by those who undertake to be our guides in the subject of protection for invention.

In the absence of this knowledge, the very best reasoning must lead to erroneous results.

I have attended the reading of many papers adverse to the continuance of the Patent-law; but I never yet heard one of a practical character, and I never yet knew the writer of one of these adverse papers able to answer the arguments which were brought forward, in the discussions that ensued, by speakers possessed of competent knowledge.

The conclusions of such writers as I have described have very great weight with certain sections of the public, who are not at the pains to investigate the hollowness of the foundations upon which these conclusions are based. But I trust that the members of the Legislature, upon whom devolves the serious responsibility of determining whether or not protection for invention shall be continued, will examine with the greatest care into the true state of the case, and will not lightly, to satisfy the most unwise desires of the few, determine that there shall no longer be protection for inventions. Should they unhappily take this course, my firm belief is (and I say it with the utmost earnestness) that the result would be, first the stoppage of all substantive improvement in the manufactures of this country, and then year by year the gradual falling back of its position among the nations, deprived as it would be not only of the foreign inventive talent which now so readily seeks development here, but deprived also of the talent of the most ingenious of our fellow subjects, who would be driven to foreign shores to find that reward for their skill which they could no longer obtain in their native land.

I believe also the very best of our artisan class would feel that by the abrogation of the Patent-law they had lost the most legitimate source of aid which they had for raising themselves in life; and hard indeed would be the task to persuade these men that those who proposed such abrogation did it for the good of the community.

And, lastly, I will ask, are we prepared to see the abolition of copyright? If not, we must retain a Patent-law; for depend upon it the natural sense of justice of the inhabitants of this country would never suffer so gross an anomaly as this, that while the inventor of a machine which he had perfected by anxious thought and large expenditure was to have no protection, the describer of that machine in a book was to have, gratuitously, a protection not only in his own land, but, by the operation of international law, in nearly all the civilized countries in the world.

DISCUSSION.

Sir Antonio Brady desired, as President of the Inventors' Institute, to say a word or two from the inventors' point of view; but, in the first place, he must express the intense pleasure he had felt in listening to this most exhaustive paper. The Patent-laws had recently attracted a great deal of attention, and lately, at the workmen's exhibition at the Agricultural Hall, Islington, they had been able to get temporary protection for the inventions of workmen there exhibited. On that occasion the inventive genius of English working men was displayed in such a manner as to surpass the most sanguine expectations; and the Inventors' Institute had been thereby induced to consider what means could be devised for developing and utilizing the inventive genius of the country, because, much as they owed to the Patent-laws, it was evident to all who had considered the subject that they were as yet far from perfect. But for these acknowledged imperfections many poor inventors would now be rich men, because at present they were unable to obtain all the protection to which they were entitled. Though there were two or three points which they considered of essential importance, they had determined on not going to the Government with any particular scheme, but to point out the great advances which had been made in the Patent-law of America, and the advantages possessed by inventors in that country. He was glad to find that, in consequence of the deputation which waited on the late Lord Chancellor shortly before the change of Government, steps were being taken to provide a respectable patent museum in the new building at South Kensington; and he thought there could be little doubt that this would be one step towards promoting that technical education about which so much had been heard of late. It is impossible to overrate the advantage to students of having a well-arranged museum of all those inventions and contrivances which have made the country great. Allusion had been made to the law of copyright; and he must say he was unable to see why an author should be entitled to protection for 40 years, and to 7 years after his death, and the patentee to only 14 years, with a possible prolongation for 5 years additional.

Major Hotchkiss thought the argument of Mr. Bramwell was unanswerable on every point. With regard to the Patent-law of the

United States he might remark that America was young and growing, with a restricted supply of human labour, which had to be supplemented as far as possible by invention. The Government, therefore, had endeavoured to foster inventive genius by protecting inventors, and not, he believed, unsuccessfully. He had had the privilege of being a neighbour of Mr. McCormick, and knew the meadow in which he had worked by moonlight (in order to avoid the ridicule of his neighbours) with the reaping-machine which had made him so famous. He also recollected the genial and generous old country squire who had assisted him, and purchased his first machine, which naturally, being but rudely constructed, was soon consigned to the lumber-room. Young McCormick, however, still went ahead; and when others stepped in, as they soon did, to claim his invention, he took his case to the supreme court, the old machine was fetched out of the lumber-room and placed before the judges, when judgment was at once given in his favour. This showed the value of cheap and speedy justice in such cases, for Mr. McCormick would have been totally unable to conduct an expensive and tedious litigation. He was thus encouraged to go on; and the machine he now made bore a printed label, showing that he had taken out no less than twenty successive patents for improvements of various kinds. In the United States it only cost £3 to file an application for a patent, and this secured an impartial investigation into the merits of the invention, which was speedily accomplished, for there was a staff of 70 examiners connected with the Patent-office, viz. a commissioner, 2 assistant commissioners, 3 examiners in chief, and three classes of examiners of 22 each divided into three grades. When an application was filed it was referred to the class to which it belonged, and then came on for examination in rotation. If the first examiner rejected it and the applicant was dissatisfied, he had a right of appeal, in the first place to the Board of Examiners in chief, and, if they also reported adversely, to the Commissioner of Patents, to the Supreme Court of the District of Columbia, and to the Supreme Court of the United States successively; but practically very few cases went beyond the Patent-office. In case of rejection the examiners were bound to state the reasons for their decision, and if the invention had been previously patented to state when and where. Nothing could be more simple, the patent and copyright law being classed together, though separate officers were allotted to each department, and the system had been found to work very successfully in fostering inventive genius throughout the country. The whole cost of obtaining protection was 35 dols., or about £7, and it was found that a large proportion of inventions came from men not professionally mechanicians, in fact almost every rank and business in life contributed. Very often the most valuable suggestions were mere modifications of existing patents, and in such cases there was generally a combined patent embodying the most useful results. Inventors from all parts of the world came to take out patents in America because the foreigner and the citizen stood on the same footing, except in the case of a renewal, when there was a distinction. He believed it would be much to the advantage of England to adopt a similar system; for many improvements were now kept secret and jealously guarded, simply for want of a cheap and easy mode of obtaining protection, the consequence being that in many large establishments it was impossible for a visitor to gain admission unless he made a positive statement that he was not interested in the particular manufacture. He hoped the day would soon come when there would be not only international copyright but international patent-right, and at the least possible cost, because he held it to be essentially objectionable for the State to receive a revenue from patent-fees. The Report of the Commissioner of Patents for the year 1873–4 states that the receipts of the Patent-office for the year were 721,111 dols., and the expenses 694,075 dols; the applications for patents were 21,077, and the issues and re-issues 13,545; the applications for extensions were 229, of which 208 were granted; 3,129 caveats were filed, and 5,287 patents expired; 6,280 patents were allowed but not issued, as the final fee of 20 dols. was not paid; 524 trade-marks and 591 labels were registered. There was a slight increase in the number of patents for the year over the year before. There are 300,000 applications on file, and since 1836 150,000 patents have been granted. An index of all patent applications and issues from 1790 to 1873 had been prepared and will soon be issued. A gazette was issued giving patent information to date. The office was issuing photo-lithographs of all the patents granted; and these were on sale at 10 cents each, or 5 cents when all of a class were taken. Inventions were divided into 145 classes.

Mr. W. **Newmarch**, F.R.S., said the current of opinion on the subject of Patent-laws seemed to be undergoing a change, there having been, some seven or eight years ago, very formidable manifestations in favour of abolishing such protection. The argument during the last four or five years, however, very much owing to the efforts of Mr. Bramwell, had been turned in the opposite, and, as he believed, in the right direction; and, after the paper they had just heard, it really required some amount of ingenuity to see what could be said on the other side. He had followed with care the course of the discussion for some years past, and, so far as he could appreciate the case on the other side, he thought the arguments resolved themselves into objections grounded on the practical effects, rather than to the general principle. It had been urged, with some force, that one effect had been to stop inventions because one man, by recording a patent in somewhat vague terms, and not following it out, prevented others pursuing a similar line, and thus retarded improvement. He was not prepared to say that cases might not be adduced to bear out this view to some extent; but, after all, this was only a matter of detail in administration, and not an argument against a Patent-law generally. Most persons, while firmly asserting the propriety of a Patent-law, were painfully sensible of the improvements which might be introduced into its working; and assuming, as they fairly might, that the most numerous classes of inventors would be found amongst intelligent workmen, it was obvious that two essential points were simplicity and cheapness, neither of which qualifications could be claimed for the English Patent-law by those most anxious to defend it. But there was no reason why it should not be made both simple and cheap. An enormous revenue was derived, he considered most unjustly, from patents (Mr. Bramwell said £90,000, but he believed it was even more); for he agreed with Major Hotchkiss that to levy a tax on patents was a greater violation of the principle of free trade than to tax even food itself; in fact, in a country dependent upon its manufactures, and which with the progress of natural science must be more and more dependent for the extension of those manufactures on the application of invention to them, it was an obvious error. Amongst the most pressing wants were a proper index, a better organized office, and proper buildings where models might be exhibited; and if these were supplied many of the objections now raised would fall to the ground. With regard to the question of litigation, the number of patent-cases tried was certainly not very large; but he had known instances in which they had gone on for days and weeks, involving enormous expense, and ending in a result satisfactory to neither party. And this seemed inevitable with the present system, under which they were tried before an ordinary jury, the majority of whom were probably totally innocent of any mechanical knowledge; and though he should be the last to suggest that English judges did not possess all the accomplishments which might be looked for in persons occupying their exalted position, it was no derogation from a man who had spent his life in mastering the intricacies of the law to say that he was not best fitted to give a decision on an abstruse point of mechanics or chemistry. If patent-cases were tried in a reasonable way, he thought provision should be made for a professional expert sitting with the judge as assessor, and for properly selecting the jury; and if these suggestions, which had been made over and over again, were carried out, he believed great benefit would result. Fortunately the Attorney and Solicitor General had no longer that personal interest in the fees which they formerly possessed; and this was certainly a step in the right direction. He hoped the Society would make a strong representation in the proper quarter, stating specifically what was required, and urging that the efficient protection of inventors was a national necessity. The mere fact of Dr. Siemens settling in England in order to enjoy the benefit of its Patent-laws was a powerful argument, but it was only a repetition of what had taken place in former times. The cloth manufacture had been introduced from Flanders, and the silk trade from France, in a similar way, because England was the safest place to live in, and its laws were fairly and impartially administered. Other countries were now overtaking her in these respects, and it was therefore eminently desirable that her Patent-laws should be made the cheapest, simplest, and most efficient in Europe.

Mr. GALLOWAY, as an inventor, begged leave to endorse all that Mr. Bramwell had said as to the necessity for protecting inventors, the hardships to which they were subjected, and the absurdity of supposing that honour alone was a sufficient recompense for their labours. He mentioned instances, in his own experience and that of others, in which inventors had been deprived of the due reward of their exertions, and expressed a hope that an attempt would be made to secure a better application of the patent-fee fund.

Mr. J. HORATIO LLOYD said he was one of those who had the misfortune not to entirely agree with the opinions expressed by Mr. Bramwell, though he regretted that time would not allow of his stating his objection in detail, which, however, he should be happy to do if the discussion were adjourned. In 1851, when giving evidence before the House of Lords' Committee on this subject, he ventured to express the unpopular opinion that the Patent-laws not only produced no good results, but actually did positive mischief, both to the community at large and to inventors. The twenty-three years which had since passed had in some degree modified his conclusions, because he had seen many valuable inventions which he should be sorry to see go unrewarded, and he had never yet been able to discover what adequate recompense could be substituted for the protection afforded by a patent. If any scheme could be devised by which the State could reward a meritorious invention, he should still adhere to his original opinion; but at present he had not been able to satisfy himself that any such method could be suggested which would work satisfactorily.

Mr. Chadwyck Healey, with reference to the objection mentioned by Mr. Newmarch that patents stopped the progress of invention, observed that the inconvenience would generally be found to arise in cases where only provisional protection had been obtained, and the inventions, after having been described in general terms, had been abandoned without having borne the test of practice. To meet this difficulty he would suggest that it might be advisable not to publish the provisional specifications of those inventions which were "not proceeded with." A suggestion which had often been put forward was that a thorough preliminary examination should be made before any patent was granted; but he took it that the present system of provisional protection, though capable of improvement in practice, offered valuable assistance to inventors, inasmuch as it gave them time to elaborate their inventions before accurately defining them. If, therefore, the system of granting provisional protection were maintained, and the doctrine that the State was not justified in taking fees for an invention for which protection had already been awarded to another were admitted, then the State must either refuse all applications of a similar nature to one for which provisional protection had been granted until the six months had elapsed—when, in case it were not proceeded with, the invention might be lost altogether,—or else applications of a similar nature would have to be received and the examination deferred until the stage of the complete specification—when, in case of rejection, the original fees paid on rejected applications ought to be returned, which would lead to great complexity and inconvenience.

The Chairman said that every speaker, with the qualified exception of Mr. H. Lloyd, seemed to agree with the general principle that the Patent-laws ought to be maintained, though it had hardly been doubted that in their administration they were capable of great improvement. It seemed to him that Mr. Bramwell had omitted one argument which would have very powerfully supported his case, when he stated at the outset that he would put aside any consideration of what he described as natural justice; for he seemed rather to concede, for the sake of the argument, that property in a patent stood on a somewhat less firm foundation than property in other things. For his own part, however, he was inclined to hold that of all forms of private property—and he was far enough from sympathizing with communism in any shape or form—property in patents and copyrights was that which most strongly commended itself to our sense of justice. He did not consider that he at all surrendered any thing of the sacredness of private property by saying that it, like all other human institutions, must find its justification in the broad general principle of its obvious expediency and necessity for the general welfare of mankind. Indeed he did not know on what other basis any institution could stand. It must, however, be conceded that private property, in particular cases, was open to certain obvious objections, which had been made the most of and carried to an extent which had led some ingenious persons into what appeared to him to be great extravagances. For instance, to take the broadest illustration, they all knew the objections to the existence of private property in land (which he believed would be found on examination to be perfectly idle). Be this how it might, in the case of inventions he could not see that any rational objection whatever could be urged against their being the subject of private property; he could not conceive how any thing could be more natural, rational, and convenient than that a man should, to some extent, enjoy the produce of his own ingenuity and intelligence—that if he invented a steam-engine or wrote a book he should be protected in the enjoyment of what he had produced. He could understand, though he could not sympathize with, persons who said that it was a strange thing that merely because a man happened to be in a particular position he should inherit a large portion of the earth's surface, and exclude every one else from it. There was some plausibility at least about such a remark; but how did the inventor exclude anybody from any thing? he was only secured in the use of that which he had made, and which, but for him, would not have existed at all. He therefore considered that on general principles property in inventions and in the copyright of books was the most sacred of all forms of property; nor did he think that position was affected by the fact that it was only as society advanced, and as the importance of inventions and literary productions made itself manifest, that legal protection was given to that form of property. He could not but agree with those who said that considerable improvements might be introduced into the law of patents, and that the expenses of litigation were often heavy. He had taken part in proceedings which certainly were conducted in a very dilatory and expensive manner, and this might to some extent be avoided; but, whilst fully admitting all this, there was another point of view from which the subject must be considered. It was said that the Patent-law did no good because it produced so much litigation; but his experience led him to the conviction that the fact of an extensive litigation taking place on any particular subject showed that the subject-matter was of great value. People do not propose to abolish medicine because physicians make large fortunes; and therefore, while he would do every thing possible to improve the Patent-law, as he would medicine and surgery, he found in the expense incurred in the one as well as in the other a proof of the importance of the subject to which it was applied. A short time ago a gentleman showed him a machine standing in a most magnificent range of buildings, and told him that it had cost him, partly in litigation, a quarter of a million of money before he could get it to work; but it had not only repaid that outlay, but built the mill into the bargain. That showed the value of patent property; and although every one would rejoice if it could be obtained at less expense, it proved the enormous importance of protection. Too much must not be expected from reforms in law, though he admitted their importance, and had done what he could to advance them. It was impossible to make the decision of a difficult question an easy matter. Something had been said about experts, and the notion seemed to be that if you had a gentleman of this sort instead of a lawyer unacquainted with chemistry and mechanics, he would be able to settle the whole matter at once. But this was a great mistake; and those who had practical acquaintance with litigation of this kind knew that the part which fell to the lawyer just as much required highly skilled labour, which it was necessary to employ and to pay for at the market price, as that of the engineer or chemist. When all possible reform had been effected, there would still be patent cases with heavy fees, long bills, and great dissatisfaction on the part of the defeated, sometimes even on that of the successful party. The question of the validity of patents did not arise pure and simple, but was often mixed up with questions of contract, of *bona fides*, of book-keeping, and mercantile questions of all kinds, and the whole got into an extraordinary tangle which would prove a very difficult task for any expert to unravel. He would conclude by moving a cordial vote of thanks to Mr. Bramwell for his valuable and exhaustive paper.

The motion having been carried,

Captain Selwyn, R.N., moved the adjournment of the debate to that day week, as there were many gentlemen still anxious to speak upon it.

Mr. F. W. Campin seconded the motion, which was supported by Mr. Hilton, and unanimously agreed to.

Wednesday, 9th December, 1874.

DISCUSSION (*continued*).

J. FITZJAMES STEPHEN, Esq., Q.C., in the Chair.

CAPTAIN SELWYN, R.N., as the mover of the adjournment, opened the discussion, and remarked that his justification in moving the adjournment had been sufficiently evident to all who had read the recent leading articles in the 'Standard' and the 'Times' on the subject, which showed that not only was the paper itself replete in interest to the general public as well as to inventors, but that the subject had come to be considered in its proper aspect as that of a great national question. The compliments that had been paid (if, indeed, truth could be called a compliment) to the lecturer he most heartily joined in. No more exhaustive, no more clearly written paper had ever appeared on that much-disputed question of the Patent-laws than the one to which they had had the pleasure of listening. The 'Times,' however, remarked, and he thought with great force, that there was a point on which Mr. Bramwell only touched slightly; having won a victory all along the line which he particularly adopted as his own, he left the question of the reform of the Patent-laws to be treated by other speakers. He was sorry that the President of the Inventors' Institute (Sir Antonio Brady) was not there again; but he knew exactly what his views were, and to a certain extent he represented the council of the institute. They wished to put forward very strongly the necessity for a wise reform of the Patent-laws. Having long fought the question, and at last successfully, that the Patent-laws were not an injury to the community, but calculated to do the community the greatest good, they now came very properly to the question of a reform; and in doing so they had come to the conclusion that they could not do better than point out the existence in a nation, kindred to our own in every thing but its governmental institutions, of a principle adopted there, which had not only given the community an enormous benefit in the development of inventive genius, but had also thoroughly satisfied the inventor. It was a system which proceeded on exactly the opposite plan to ours, which, instead of leading the inventor by the hand towards success, as the American Patent-laws indisputably did, practically took him by the throat and robbed him. The contrast of the way in which these things were done in America and in England was so strong that he could not avoid bringing it to their notice. In this country they gave to any two men who chose to go together to the Patent-office, holding the same views, describing the same invention in the very same words,—they gave them both a patent. That was really nothing but a permission to go to law; and the lamentable result of a patent so given was, first, that an enormous number of worthless patents were given, and secondly, that large sums of money were spent without the slightest prospect of a return. The American Patent-law proceeded in exactly the opposite direction; it investigated fully and fairly the validity and the originality of the invention. As Major Hotchkiss had told them, there were 70 examiners altogether, divided into three classes of about 22 each, and so much care was taken that, in a recent case, three days were spent in examining an invention. What was the result? Very few patents were contested, and a great many were brought to a successful issue. An inventor could never benefit in the smallest degree unless the community benefited in a much larger degree; and so whatever could benefit the inventor is felt as a benefit by the community at large. It had been urged that they should give to the toiling masses technical education, and that they should raise them in every direction; but they had also heard, over and over again, from the chiefs of labour, that this would be only a snare and a delusion unless they gave them some prize to contend for. If for their brainwork they got protection, then we might rely upon it that however fierce the struggle, or however few the prizes to be won, those prizes would not fail to stimulate a large amount of intelligence. The whole basis of society was very well known to be the protection of property; but whereas property in land, money, houses, was not nearly so susceptible (and in this country the former was hardly at all susceptible) of extension, there was no limit to the development of the wealth created by intelligence; and in proportion as intelligence was encouraged to produce valuable products out of waste materials, so would great fortunes be founded and wealth increase. He did not pretend to lay down a straight path from which there should be no deviation, but simply to put before them in what respect the laws should be modified or altered. He did not presume to say that the Patent-laws of this country should be the same as those of the United States, or that the intelligence and industries of the two countries were so similar that they required exactly the same legislation; but he did venture to say that there was a model which had produced good effects, and his warmest desire was that it might be copied successfully. The less the costs that were paid by the inventor, the greater would be the benefit to the community at large; for whatever costs were paid out of pocket by an inventor, or by those who contested an invention, must eventually fall upon the consumer.

Mr. F. W. **Campin** said he would not dwell on the question of how the Patent-law might be improved, but he would say a word or two with regard to the main subject, namely, the expediency of patents. Mr. Bramwell had alluded to the fact that inventions were often produced by men who were not connected with the trade or profession dealing with the subject of their inventions. That was perfectly true; and it seemed to him to be the strongest possible ground for maintaining the system of a limited property in an invention as the reward to an inventor rather than any scheme of national rewards. Inventors were not usually rich men, and, generally speaking, they were quite incapable of doing any thing for the practical development of the invention they had made. They therefore had to go to manufacturers or capitalists; and when they did so was it to be expected that the manufacturer or the capitalist would take them in hand unless it was to make some property in the invention or get some advantage by it? As a matter of practice he had always found that when a capitalist was brought to aid an inventor the very first thing that he went into was the question of whether the patent was a valid legal property. That showed that he looked very much to having a legal guarantee that the money he was going to spend would be secured to him. On the subject of amending the Patent-laws he would add just this: there ought to be a provisional stage entailing the payment of very small official dues (shillings rather than pounds), a stage of completion of patent preceded by examination into novelty and legislation of the right, and, if practicable, a stage of determination of indefeasibility. Indeed the first two were absolutely requisite to render the patent system of real benefit to the great majority of inventors.

Mr. J. **Horatio Lloyd** had entertained great objections to the general principle of a Patent-law, but those objections had been much modified and overcome by the consideration which had been given to the subject. He had been unable to devise any other system of rewards to inventors, and therefore he had been compelled to modify the conclusion he had originally come to, and to express a reluctant acquiescence, though not a settled conviction, as to the expediency of protection for patents. He would add his humble voice to the general chorus of applause with which Mr. Bramwell's paper was greeted. To him, he confessed, it seemed a most wonderful production; the composition was admirable; the order was clear; the language lucid and precise. It was, in fact, a marvellously wonderful production of the human brain. But there was one thing in that essay (for essay it was) which he admired more than any thing else, and that was the marvellous dexterity and skill and artistic talent which had been brought to bear on one side of the question. He should designate it as the written speech of a most able and skilful advocate. He showed perfectly the one side of the question; in fact Mr. Bramwell had taken up the part of an advocate, and if he were not so eminent in the profession in which he laboured, he should have said that no man could have distinguished himself so much had he chosen the profession of an advocate. But he could not help thinking that if there should be found an advocate equally dexterous and equally skilful, there might be adduced arguments as weighty and as powerful on the other side of the question. He did not wish to play the part of the *advocatus diaboli*, for he knew there was a general consensus of opinion on the subject, and he saw from the tone of the meeting that there was a general consent, in that Society at all events, to the principle of the Patent-laws. Perhaps it was difficult, it might be even impossible, to suggest a good substitute; but, nevertheless, there were great evils in the existing system, and if he did not believe that they were generally admitted, and that there was an earnest intention and desire to remedy them, he should adhere to his former conclusion, that, notwithstanding there might be meritorious inventors who might suffer by the abolition of the Patent-laws, it would be better that those laws should not exist. But, as he said before, he had modified his conclusions. Of course it was impossible for any man having a right heart and mind to say that you should avail yourself of the genius, and the labour, and the talent of the inventor, without giving him some remuneration. But he thought, nevertheless, that Mr. Bramwell had put the case too high; and he could not agree with him that the stimulus of mere gain which he had put forward as the incentive was the most material one. It certainly was not the only one which entered the mind of great men in the great discoveries and the great inventions which had been made. The men who had been the great benefactors of mankind had not been stimulated by the mere hope of gain, but by a much higher feeling. He could not believe in the man who would come forward and say he had a great invention, but if they did not pay him his price he would hold it back. There were many men who had given their time, and labour, and talent without for one moment entertaining any idea of receiving any reward except that which Mr. Bramwell had so merrily disposed of, the reward of honour—the reward of thinking they had done some good for the benefit of their fellow men. He could not go along with Mr. Bramwell in many of his propositions. He might admit his conclusion, and yet dispute many of his premises; and he could not for one moment admit that that low feeling had actuated many to whom the world was indebted for its greatest discoveries and inventions. He did not find that the greatest inventors had been so actuated, nor did he find the Patent-laws brought out those inventions. Take, for instance, the electric telegraph, or the method of propelling steam-vessels. He would challenge Mr. Bramwell to say who was the inventor of the electric telegraph, or to whom could be attributed the merit of the invention of steam-propulsion. It was impossible. Ronalds, if anybody, was really the originator of the telegraph. The application, the mere mechanical contrivance, might be claimed by Cooke and Wheatstone, but the idea, the thought, that which had developed itself into this mechanical result or appliance, belonged to another. He did not seek for gain. That was not his motive. Take, again, the instance of the locomotive. He would defy any man to say who was the inventor of that. That invention was a growth; it was not a sudden creation. It developed itself from time to time, and out of one thing sprang another, till at last the idea came to be matured into something practical. It was not a stimulus of that low kind which created such inventions, although, he admitted, it might act upon others. There was a class to whom the love of gain was the stimulus, and who did not mind stealing the work of other men's brains, and who got the reward; but these were not the men whom the laws of the country ought to encourage and protect. In the present state of the law, unless it were improved, he should still doubt whether it were desirable to protect the inventions of such men. Mr. Bramwell had asked inventors, were they satisfied? and what was the answer? A loud scream of discontent; and so he said every one should get up and complain of the law. But it was his duty to show both sides of the question, and not one only. It was his duty to show the evils that arise from such a law as well as its benefits; and so he did, for he gave seven objections which were urged against it, but all of which he disposed of in the most perfunctory manner. It was his duty, in stating the case, to show whether the advantages of such a law counterbalance the evils. But he did not. He merely gave seven heads of objections which had been raised in a discussion which took place last year, and a great many of the observations on which were really futile. The first was interference with freedom of trade. Now free trade was a term which was often used, but it must have its limitations. Then another objection was that British manufacturers were put to a disadvantage compared with the subjects of countries where there were no Patent-laws. That Mr. Bramwell disposed of at once as being worthless; but he must say that he thought he might have shown a little more justice to Switzerland than he did; and he remembered that in Switzerland there was one of the finest establishments of mechanical inventions that existed anywhere that he knew. So he easily disposed of two of the seven objections which he put forward; and of two others (namely, that patents were given for useless things and for things which were not new) he disposed in about two or three lines, when the great objection of all was that there was a class of patents which had no object and no use. Mr. Bramwell had touched very lightly indeed upon his adversary's case. He did not discuss it, but left that to others. What he did say was not complimentary to the many other persons who had thought otherwise, and to whom he might have given a little credit of having thought on the subject. Then he spoke most slightingly of the feeling of honour, quoting a passage from Shakspeare. Either he meant to imply that Shakspeare was of that opinion, or that he (Mr. Bramwell) adopted that sentiment of Shakspeare. He was unwilling to think the latter, and he was sure it was not true of the former. It was about the most ignoble thing that ever was uttered, and it proceeded from the mouth of the most ignoble character that ever Shakspeare created. And who was it? Sir John Falstaff. And on what occasion did he utter it? When he was meditating whether he would not fly from danger. But did Mr. Bramwell mean to say that men were influenced by such a consideration as that? Did he mean to say that there was no desire for posthumous fame in the minds of men, or that they never think that their fame will be perpetuated and their name handed to posterity? Mr. Bramwell had instanced a fanciful country parson who having made an invention might be unable to protect it without the aid of a Patent-law, and had also spoken of the necessity of protecting the manufacturer, who must keep his invention secret. He thought secrecy was most demoralizing, and the man who did not convey his secret, but exposed his workmen to temptation, deserved no reward. Mr. Bramwell had instanced the case of Crompton, and said that burglars had broken into his premises to steal his secret. He wanted to know why he did not get a patent; and he could not help thinking that Crompton at that time had a very serious misgiving as to its value — another instance of the futility of hoping for reward. Another case cited was that of Dr. Potts. He did make a very good invention, but it was said he never would have a reward. But did Dr. Potts try his invention by experiment? If he had not done so his description would have misled, because it was only by the experiments afterwards that it was discovered what did cause the cylinder to sink—namely, the displacement of the loose material. He did not think Dr. Potts deserved any reward. He would conclude his remarks by saying that he was a *quasi* convert, and had tried in vain to find some other reward. He certainly desired some modification of the Patent-law; but in justification to himself he was bound to say that at the time he gave his evidence, in 1851, the law was in a very bad state, and there were great evils, and such as seemed to say that unless a remedy were found he would rather not have a Patent-law at all. Since then a great deal had been done. In 1852 the law was changed, and an Act was passed; but the most material part of that Act (namely, the appointment of a Commission which was to take the initiative in ascertaining whether the invention was new and so forth) was a nullity. In 1871 there was a committee again appointed, and they recommended that that Commission should be formed. That, however, had not been done, and it showed how necessary it was to exercise vigilance. What he would venture to suggest would be that this Society should appoint a standing committee to look after the matter, to see that it was done, for it was really a necessary thing. One recommendation was that there should be an obligation to grant licenses, and if the terms were at all in controversy or dispute the body so appointed should adjust them.

Mr. J. HINDE PALMER, Q.C., having been a member of the Committee of the House of Commons in 1871 and 1872 to inquire into the Patent-laws, said he had necessarily taken great interest in the subject. But when he saw the heading of Mr. Bramwell's paper he began to think they had gone back in point of time for three or four years, because he had considered that what took place before that committee had put an end to the idea which had previously prevailed in favour of the total abolition of protection for inventions. There was a general feeling, he thought, throughout the country, exemplified by the evidence given before the committee, that it was desirable that there should be protection of inventions. And not only had that committee reported in favour of the protection, but there had been an International Congress of all countries at Vienna, which Congress, after very mature deliberation and considerable discussion—several taking up the view of abolition which prevailed in this country,—after all that full discussion, they came to a division upon the simple principle of whether there should be protection or not, and 74 voted for it and only 6 against it. The preeminent position which this country holds as a commercial country was to be traced to the manufacturing industries of the land; and that which had tended more than any thing else to elevate that industry to the height which it had attained, he felt was our mechanical inventive genius under the protection of the Patent-law. Lord Selborne, then Sir Roundell Palmer, made a most powerful speech in the House of Commons against protection; still he considered he was justified in saying that at the present time the conviction of every one who had had experience in the matter was that protection for inventions was a matter of justice, a matter of policy, and, as Mr. Bramwell had said, a matter of expediency. But if any doubt did really exist at all upon the question, it was dispelled by the able paper of Mr. Bramwell; and he could only express his earnest wish that it had been produced in the way of evidence before the Committee, because if it had been produced there he felt sure it would have brought conviction to the mind of every one. Mr. Lloyd said he had been converted. Generally speaking, converts became rather too enthusiastic on the other side; but there was also another saying, that he that was convinced against his will was of the same opinion still; and he feared there was lingering in the mind of Mr. Lloyd a strong idea that patents for invention had better be abolished altogether. Shortly after Lord Selborne had made a speech in the House of Commons, he took the chair at a large meeting of skilled artisans at Aldersgate Street, held upon the avowed principle of total abolition of patents for inventions. The several artisans discussed the question in favour of the protection of inventions, and the gentleman who was intended to move the resolution in favour of the total abolition was so convinced by the arguments he heard on the other side, that, to the great surprise of Sir Roundell Palmer, he actually himself altered the resolution to one in favour of the laws, and carried it with only two hands held up against it. The committee which inquired into this matter was composed of twenty-one members, presided over by Mr. Samuelson, and a great number of men of experience in patent matters (Mr. Siemens, Mr. Nasmyth, and many others of the best witnesses that could be obtained) gave evidence; and the conclusion come to, after most matured deliberation, was that "Letters patent promoted the progress of manufactures, and led to the introduction and publication of numerous improvements, and contributed greatly to the progress of industry." From that it might fairly be concluded that protection of inventions was a matter of policy and a matter of justice. As regards pecuniary rewards for inventions, everybody in the House of Commons thought they were perfectly impracticable. You could never tell you were rewarding the right man, and it was felt that they would be a source of great evil and corruption. The only other alternative, therefore, was to give a right of property in the production of a man's inventive genius. But all seem agreed that the laws ought to be amended, and there were two points upon which amendment was required. First, that there should be a preliminary inquiry before the patent was granted: this was already granted in the Act of 1852; but it had become a practical nullity, for the clerk of the Attorney General was examined before the Committee, and it was found to be a matter of routine, and that, so far as any preliminary investigation was concerned, it was a mere myth. One great objection urged against the Patent-laws was that a great number of frivolous and almost useless patents were granted to people, and that patents were granted to others who were really not entitled to them. If the preliminary investigation were conducted by experienced and able men, who were not law officers of the Crown, that great objection would be removed, and the investigation would be such that only those patents which appeared to be of substantial beneficial public advantage and novelty would be granted. That preliminary investigation would be of great utility, and the object of the Act of 1852 was to appoint a Commission who should be able to carry it out. But the Commission was a mere formality, composed as it was of the Lord Chancellor, the Master of the Rolls, the Attorney General, and the Solicitor General. The Master of the Rolls was examined before the Committee of the House of Commons, and he said that nothing could be worse than the Commission—that the whole thing was, in fact, delegated to one officer, Mr. B. Woodcroft, F.R.S., a very efficient gentleman; but all the labour devolved on him. It had been suggested that this Commission should be reinforced by the appointment of additional Commissioners, who should be persons of experience in manufactures and chemistry, and in the branches of trade to which patent inventions were most likely to relate. That was the first step to be taken to constitute a really efficient Commission to conduct the preliminary inquiries, and that would lead to a great many amendments. An application was made to the late Lord Chancellor Hatherley on the subject, but nothing was done; and he looked, therefore, with great satisfaction to the agitation now being carried on, as it must lead to some result, for in this country it was well known nothing could be obtained without constantly agitating, and constantly pressing on the attention of the

Government of the day the necessity for their action. He did not think it was necessary to go to the same extent in this country that was done in America, because, on looking at the number of patents granted in England in 1872, he found they were not quite 3000, whereas in America there were applications for 13,000 in that year, 12,000 of which were granted. Probably one inducement by which the number of applications were so greatly increased in America was that the cost was considerably less than here; for while there it was only £7, here a patent could not be obtained for less than £175. There was an idea prevalent in some quarters that it was not desirable to make the cost of patents too low; but it need not be so high as in England, where it was much dearer than in any other country. One of the great objections made by abolitionists, as he might call them, would be completely cured if a proper system of preliminary examinations were adopted. It had been urged that patents operated to stop the way and prevent future improvements; and this had been illustrated by Mr. Nasmyth with reference to the steam-hammer, and by others also, and it was said that if a patent were applied for for an improvement in a preexisting invention, there was great difficulty in obtaining the consent of the first patentee. This view had been urged by Sir R. Palmer in the House of Commons, and by Mr. Justice Grove before the Committee; but it would be obviated by another recommendation of the same Committee, viz. it should be made compulsory to grant licenses on equitable terms and conditions. This suggestion had also been very fully discussed at the Vienna Congress, and adopted. It was said that inventors would not work together, as they had been reported as doing in America; and no doubt there might be difficulties on that score. Some persons might be inclined to be litigious, to listen to no terms, and to refuse permission to any one else to make use of their inventions for the purpose of an improvement. But then would come in the provision for compulsory licenses; and if it appeared to be for the public advantage that the second inventor should carry out his improvement, there might be a tribunal to determine, in case of difference, what was a fair and just royalty to pay to the first patentee. The question then arose as to who should be intrusted with this power, and it was finally determined that the Patent Commissioners should be the ultimate authority on such questions. Thus they again come back to the necessity for an efficient Patent Commission; and, in fact, such a body, making satisfactory preliminary examinations of inventions and compulsory license-clauses in all patents, would go very far to meet all possible objections. He would add, that at the very time when Mr.

Samuelson moved for the Select Committee, he (Mr. H. Palmer) introduced a short Bill, which also bore the name of Mr. Mundella, for the amendment of the Patent-law; and though no doubt it was far from perfect, if it had got into committee, it might have been made satisfactory. He did not think much legislation was required; and this short Bill provided for the two main improvements he had already spoken of, with one other which had been frequently mooted, and which seemed in many ways desirable, viz. the possibility of granting (after a first period of exclusive enjoyment, and under certain conditions) indefeasible patents, in order to prevent the enormous litigation which was complained of, although this had been much exaggerated. Of course such a patent would only be granted after full notice and opportunity had been given to any person to object; and, with due precautions, he saw no reason why the idea should not be adopted. He trusted the Society of Arts would not now leave this great national question unsettled, but would press upon the Lord Chancellor and the Government the absolute necessity, in a great manufacturing and commercial country like England, that the Patent-laws should be made in some way efficient, and to tend more than they now did to promote and stimulate genius.

Mr. B. Samuelson, M.P., said he was very glad that Mr. Bramwell had taken up this subject, not because his views required demonstration, but because it brought the whole subject forward and attracted public notice to it. If he had any fault to find with Mr. Bramwell's paper it would be somewhat of the same character as the exception taken by Mr. Lloyd, that matters had been represented rather too much *couleur de rose*. It was doubtless a good plan to put the best face on matters; but it might be carried to an extreme, and the danger in the present case was that you thereby furnished arguments to your opponents. It could not be denied that there were differences of opinion about patents, nor that there were grave defects in the English system. It would not do to insist that without a Patent-law invention would not proceed, nor that under the English law inventors got all that was due to them, whilst manufacturing progress was promoted as much as it might be under a better system. With regard to the non-existence of Patent-laws in other countries, Mr. Bramwell had made light of the example of Holland and Switzerland; but Mr. Lloyd had referred to the large establishments in the latter country for the manufacture of spinning-machinery; and it was the undoubted fact that spinning-machinery manufactured without a Patent-law by Messieurs Rictor, of Wirtuker, was driving English machinery out of the south of Germany and the north of Italy. It might be said that that was simply a question for the manufacturer; but it was depriving England of so much employment for labour. Then, as to the nature of the present law, under its provisions it was impossible for the manufacturer to obtain a license except on such terms as the inventor chose to impose; and though it was quite right that the manufacturer should pay just terms, it was not right that the industry of the country should be crippled through the obstinacy of the inventor. In Switzerland a dozen different inventions might be combined in one machine, while here every maker had to go "on his own hook," as it was termed—the result being, as he had already stated, that better and more complete spinning-machinery could be obtained in Switzerland than in England, owing to the obstruction of patentees. Holland was a small country with only two millions of inhabitants; but he would ask the sugar-refiners of London, Liverpool, and Bristol how they felt under the circumstances of the Amsterdam refiners being free from any patent dues, whilst they in England were at the mercy of patentees. No doubt other instances of a similar kind might be mentioned; but one thing Mr. Bramwell had omitted altogether to state, viz. that in Germany, though there was nominally a Patent-law, virtually there was none whatever; and if it had not been for the unfortunate war with France, he believed the consequences would have been ere now perceptible in this country. Therefore, while not abolishing the Patent-laws altogether, every effort should be used to make them as efficient and as little obstructive as possible. The last speaker had referred to the Committee of the House of Commons which sat for two sessions; but for all the good that had resulted (unless the present discussion were to be reckoned as one), it might as well never have sat at all. Ever since the report was issued, with which he believed not a single fault had ever been found by anybody, one deputation after another had been to the law officers of the Crown, and had urged upon them to take the matter into consideration; but nothing whatever had been done. He did not believe any fresh legislation was required, or, if so, it would be so slight in character that there should be no difficulty in carrying it. The Act of 1852 gave power to the Lord Chancellor to appoint Technical Commissioners; and if such a body were judiciously chosen, he ventured to think they would find in the law as it stood all the materials for building up a system of patent administration which should do all that it was possible for any Patent-law to do in favour of both patentees and manufacturers. There was already power to appoint examiners (the Commissioners might either act as such themselves or appoint qualified persons for the purpose), and there was also power at present to insist on the granting of licenses. Within the last few weeks there had been an instance of the renewal of a patent to the Martini-Henry rifle, the condition being imposed that every manufacturer of small arms for military purposes should be at liberty to use the invention on paying a license-duty not to exceed 2*s*. In fact every patent granted contained the words that it was on such conditions as the Crown saw fit to impose, which could, of course, include requiring the patentee to grant licenses on reasonable terms. With regard to litigation, it had been said that in all matters involving valuable property important litigation would be sure to arise; but he could not but be reminded of the fable of the boys and the frogs, since what was only sport to a certain class of gentlemen was death to the inventor; and he did not think that so much litigation was at all necessary. It would, however, inevitably take place so long as a patent for the same thing was granted by the Attorney-General in one office and by the Solicitor-General in another—nay, while two patents for the same thing were granted by the Attorney-General in his own office at the same time. These learned gentlemen did not know what they were dealing with; and if the same thing were called A in one specification and B in another it was of course considered to be quite different. It should be insisted upon that all inventions should be described intelligibly, though there was not much use in describing them for the Attorney- or Solicitor-General, who had not time to read the specification. Only a short time ago he had a patent refused, and of course thought there was some error in the description; but on inquiry it appeared that the great difficulty lay in the attestation clause, which did not properly express that the person, before whom the declaration was made took it from the intending patentees jointly and severally. If he described a thing as an oval, and some one else described the same thing under the name of an ellipse, a patent would inevitably be granted for each. The appointment of efficient Commissioners lay at the root of the whole thing; and no good would come of all their discussions until this was done, due care being taken to avoid jobbery. In spite of all that had been said about honour not going far, he believed there were many men who would count it an honour to be intrusted with the adjudication of such important interests, and who would desire but a nominal salary, if any. But even if good salaries were paid, they would be saved fifty times over in the course of a year. As had been said by Captain Selwyn, the Patent-law ought to be so administered that, instead of taking the inventor by the throat, it should take him by the hand, and in many cases, especially if he were a poor man, show him that he had better not waste his money and, what was of more importance, his time and energy, over a thing which some one else had invented forty years before and abandoned as impracticable. Difficult questions arose about imported inventions; but he considered it a scandal to the State to allow a patent to be enforced simply as an obstruction. Not long ago he was shown a watch, with a particular arrangement for winding, which was patented in England; and on asking whether they were made in Birmingham or Coventry, he was told they were not made in England at all, neither were any licenses granted, because it answered the patentee's purpose better to have them made in Geneva. That was not doing justice to English artisans; it was not allowed in France or any other country, he believed, except in England; and he doubted whether it was not almost worse than the course adopted by certain schemers between whom there was a race who should be first to steal an American invention, bring it over here, and patent it. These, however, were minor points; the main thing was to get proper persons appointed to administer the Patent-law, and every thing else would soon follow. In fact he did not believe there would be any difference of opinion between the Commissioners as to the small legal changes which would be required. He had purposely avoided discussing the question of property in invention, because it would be only throwing doubts upon a thing which was already settled in the minds of most people. In conclusion, he hoped the Society would follow up this question, urge it upon Parliament, and not allow it again to go to sleep; for ministries changed and work accumulated, and, unless a strong pressure of public opinion was brought to bear, very little was ever done.

The discussion was then adjourned.

Wednesday, 16th December, 1874.

DISCUSSION (*continued*).

William Newmarch, Esq., F.R.S., Corresponding Member of the Institute of France, in the Chair.

Lieut.-Col. Strange, F.R.S., congratulated Mr. Bramwell on the great interest he had elicited by his paper. It was true he had confined himself to a form of the question on which there existed really very little difference of opinion; but, in doing so, he had added greatly to our knowledge on the subject. He wished, however, that Mr. Bramwell had devoted a little more of his paper to the subject of the present evils of the patent system; and he would venture to suggest that he should on some future occasion give another paper on that branch of the subject. The party which maintained that the Patent-laws should be abolished placed themselves in a most extraordinary position. They said, abolish the laws entirely, and then, admitting their necessity, began to think about providing some remuneration or reward for invention, only to find, however, as Mr. Lloyd admitted,* that this could not be done, for there was really no method of doing it satisfactorily. Mr. Macfie (a great authority on the subject), in his letter to 'The Times,' distinctly admitted that rewards were impracticable; so that abolitionists placed themselves in the position of abolishing the present system without providing any substitute for it. Last week the discussion had turned not so much upon the abolition of the Patent-laws as upon the improvement of them; and two gentlemen of great authority (Mr. Hinde Palmer and Mr. Samuelson) had spoken to that point, and told them that the Committee of the House of Commons, to which the question had been referred, and of which they were members, had made a specific recommendation, which they said, and which every writer on the subject also said, lay at the very foundation of the whole question—namely, that before patents were granted they should undergo preliminary investigation. There seemed to be a complete unanimity of opinion that that was absolutely necessary. But those gentlemen had also said that no legislation was necessary to carry that into effect. The law which at present existed empowered the Patent-Commissioners to establish a tribunal for that purpose, to be composed of competent persons, to carry on this preliminary investigation. It only required to be administered, they said. But why was it not administered? He would tell them. The money required to carry it out was begrudged. Six years ago he had the honour of sitting on the Council of the Royal Society; and that eminent body received a letter from one of the great legal functionaries who act as the Commissioners, saying that they considered it necessary to have highly qualified scientific men to make the preliminary investigation. They intended to have an eminent chemist, and had applied to the Chemical Society to nominate one. They required a skilful mechanician, and had applied to the Institute of Mechanics with a view to the appointment of one. They wanted a gentleman versed in natural philosophy, and therefore applied to the Royal Society to name a gentleman qualified for the position. And the letter went on to say that gentlemen of eminence in science would no doubt be ready to give their services to the country with the object of advancing the knowledge of and benefiting the community at large, and that they would not require any remuneration for such services—in fact, that they would receive no salary. The Council of the Royal Society received the proposal with derision; and a resolution was unanimously carried requiring the President to call upon the high legal functionary who had sent the letter, and inform him that the Royal Society declined to ask any gentleman to give up his time and services for nothing, in order to advance that which had for its object the making of money by individuals and the conferring of great benefit on the community at large. The President faithfully delivered the message; and at the next meeting they had the reply, which was to the effect that the high legal functionary knew nothing about the matter, that the letter had been written by some subordinate, and that it was altogether a mistake. These high legal functionaries were paid enormous salaries for doing work which they do not perform, and their presence as Commissioners rather retarded than advanced the reform of the Patent-laws, and yet they wished for the services of eminent scientific men without remuneration. They had power over a fund which had a surplus of something like £95,000, and yet they begrudged to pay out of it the salary necessary to get eminent men to do work of vast importance to the country. He was exceedingly pained by the observation of Mr. Samuelson last week on this subject, when he said:—"In spite of all that had been said about honour not going far, he believed there were many men who would count it an honour to be intrusted with the adjudication of such important interests, and who would desire but a nominal salary, if any." He had heard that with great pain, for no gentleman in the country was better informed as to the value of the services of scientific men, and of the impulse which they gave to the industries of the country, than he was; and yet he said their services ought to be given to the country for nothing. He protested against the nonsense that had been talked on that subject, especially by one of the speakers on the last occasion. There was no dishonour in labouring for money. Every profession did it. He did it himself; and Mr. Horatio Lloyd, who had made honour the great criterion, had himself most honourably worked all his life, most probably for money. He himself was a patentee; but he confessed his object in taking out a patent was not to benefit the community but to make money. And if he did not make money the community would not be benefited.

Mr. H. T. Wood wished to bring forward a few facts with relation to the American system which might, he thought, throw a different light upon it to that in which it had been represented by some of the previous speakers. With all deference to the judgment and authority of those gentlemen who advocated such a change, he ventured to think that the adoption of this plan would be pernicious in the extreme, and a most unhappy departure from the admirable lines upon which our own system was founded. Imperfect in its details as this system might be, it was, he urged, absolutely correct in principle, and a reform in a few comparatively minor administrative details was all that was required to make it as admirable in practice as it already was in theory. That our Patent-law, as now administered, possessed many and grievous defects, was not to be denied; but the defects were easy of remedy and such as (were the reformers less insistent each on his own scheme) might very easily be repaired. The best possible example of the plan of previous examination was offered by America. The advantages of the system of that country had been already sufficiently dwelt upon. In the face of such extreme laudation it was difficult to believe that this system was condemned by a large part of the American press, both popular and scientific, that its action had, in numerous instances, been condemned by the American courts, and that it was itself condemned by implication in the last official report of the American Patent-office. In that document Commissioner Leggett stated that each Examiner in charge of a class now works entirely without supervision, and that "the result is that very many applications are hastily and carelessly examined, very many patents are issued every year for subject-matter not patentable, and applications are rejected upon which patents should be granted." He adds that from the bad drawing of the specifications many patents are "exceedingly annoying and damaging to the public" from being "permitted to cover not only the applicant's invention, but very much that is well known and open to free use by the public." How well merited these remarks are might be seen from an inspection of the American Official Gazette and the published specifications of the office. It would of course be impossible to lay before the meeting any great amount of evidence on the subject; but he (Mr. Wood) had brought in a few specimens, a dozen in all, which he would lay on the table and ask gentlemen to examine for themselves. Most of these were utterly trivial and useless. In one case a patent had been granted for a method of opening an envelope by a thread affixed thereto, and a second patent had been granted for a similar thread but with a knot upon it. In another case a patent had been granted for a method of fixing a small looking-glass to a toilet-glass to enable a lady to see her back hair. This had previously been patented three times in England. It had been advertised and illustrated in the catalogue of a well-known furniture dealer (Mr. Heal), and it had been exhibited before the Society of Arts and figured in their Journal. If this was not prior publication, what was? Even in their own office patents were duplicated. On May 21, 1872, S. Boyd patented a method of cutting boot-soles in a particular way, so as to economize leather. On June 25, in the same year, J. Woodley patented absolutely and identically the same invention. These were not rare and unusual instances; they were taken from a great mass of similar examples. When the patent questions came before the Court, it was not unusual to find the judge animadverting most severely on the action of the Examiners. In 1871 a patent was granted to Seeger and Boyd for packing ground hops in air-tight cases. This, coming incidentally before the Court, the judge remarked on it in the very severest terms:—"Why such a patent should have been allowed is beyond my comprehension. A mere child can put ground hops into a bottle and cover the cork with sealing-wax. . . . . Unfortunately the patent is beyond the control of the Commissioner." In 1872 a patent was granted to Leggett for making shovels of cast iron. On this the Commissioner said:—"It is a matter of astonishment to me that the patent was ever granted, and of greater astonishment that the extension has been reported on favourably by the Examiner." It would be easy, but useless, to multiply examples which could be readily gathered by anybody for himself from the official records of the office. These might serve to show the real action of that system which was so over-praised in England, and would prove how far justified was the principal technical journal of the States, the 'Scientific American,' in persistently advocating a change to the English plan. But had the advocates of this system ever considered what such an alteration really implied? It was all very well to talk of three Examiners; in America they had seventy, and were crying out about the work being scamped. Nor was it correct to suppose that the work of the English Patent-office was much less than that of the States. On an average each English patent represented three or four American. It was not an uncommon thing for fifteen or sixteen American patents to be required to cover the same ground as a single English patent. There was therefore no reasonable expectation that the number and consequent cost of the staff would be less than in America, and it might be expected that a yearly charge of about £30,000 would have to be met. How the Treasury would regard the proposal thus to cut off a third of the patent revenue might perhaps be imagined. And for what good object would this costly staff be collected? Simply to dispose of a lot of useless patents which would die of themselves in a few years. There was a great outcry about these useless and frivolous patents; but what harm did they do? They certainly increased the labour of a search, but that would easily be remedied by good indexes. If a man liked to waste his time and his money in insane inventions, it was no part of the duty of the Government to interfere. Surely the work of ascertaining the novelty of an invention belonged to the inventor. It certainly might be well to require an affidavit from the intending patentee or his agents that a search had been made and that the thing appeared new. Perhaps it might even be possible to make all patent agents officers of the court, as it were, and compel them to take out a license. Then every inventor would have to employ an agent, who would be obliged to assert that he believed the invention to be new, and would be liable to fine for a false declaration. When an invention showed signs of vitality, when litigation or opposition was threatened, then if some Board could examine and report officially on that invention, good would be done; and for this purpose either a permanent board might be appointed, or a special committee of qualified persons nominated in each case. But it was not enough to say that previous examination would be useless, it would not seldom be actively mischievous. How many patents on which fortunes have been made, and rightly made, might have been refused on the ground of some wretched prior invention, never carried to any fulfilment? Supposing an Examiner had refused Mr. Bessemer a patent for his great invention on the ground of want of novelty, as he certainly would have done if he had before him the specifications of Martin and others for the same process. What greater injury could have been inflicted on what more important manufacture? Was not the mere possibility of such a case arising enough to explode the whole scheme? No, this might be depended on, that free trade in invention, as in all else, was the wisest and safest policy: the progress of science and the good of the State would be far better served by giving the utmost facilities to individual genius, so that each man might prosecute his own ideas in his own way. This was the sound and secure basis on which our present laws were founded, and any attempt to pull down the old structure and replace it by a new, could not fail to be most injurious in its issue.

Mr. John Coryton regretted having been prevented by illness from hearing Mr. Bramwell's paper and the earlier part of the discussion; but he had had an opportunity of hearing the latest views of the advocates of patent-rights as enunciated by the deputation which had waited on the Lord Chancellor in Lincoln's-Inn Old Hall on Monday evening last. He was greatly surprised at what had taken place on the reception of that deputation. He had expected that Sir Antonio Brady would remind the Chancellor that he had been placed at the head of the Commissioners by Act of Parliament for the purpose of protecting inventors from having their ideas filched from them on the one hand, and protecting the public against fraudulent inventors on the other; that that was the duty placed upon the Commissioners, but that not one of them had taken the slightest trouble in the matter; that he would have referred to the report which had been made by the Committee of the House of Commons, who had investigated the subject in 1872, and which said that the Lord Chancellor, the Master of the Rolls, and the English law officers of the Crown were now the only Commissioners, and that by reason of their other engagements it was very difficult to get a meeting; that, practically, an officer in the Patent-office did the duty of the Commissioners. He thought that the foreman of the deputation would have told the Lord Chancellor of his duty, and how the whole subject had been neglected since the Act of 1852 was passed. But nothing of the sort occurred. The deputation was exceedingly polite, and the meeting seemed to have resulted in a sort of mutual admiration society, the deputation congratulating and praising the Chancellor, and the Chancellor in his turn praising the deputation. The Act was an uncommonly good Act if it were properly carried into effect. But it never had been. The other person or persons who were to have been added to this Commission were never appointed, because there was no provision for paying them. The Attorney- and Solicitor-General, who had some £10,000 or £12,000 a year from the Patent-office funds, on the supposition that they attended to inventors, had too much other work to do to attend to this matter at all. And if they wanted to give it a fair trial, they must get the right men as Commissioners in the right place, and give them a liberal remuneration for their services; and he did not see how the surplus could be better applied than in this way. But he was not altogether favourable to the granting of patents. Suppose A, B, C, and all the rest of the letters of the alphabet were inventors. If A got his patent, what became of the rest? They were shut out, and a grievous injury was thereby done in many cases. The great fault was that there was no supervision, and that very little attention was paid to the public interest. As to the rights of the patentee, what were they? They were founded upon an Act passed 250 years ago, which originated with the necessity of terminating the grants of exclusive privileges to courtiers; but it was never intended that such patents as were granted at the present day should be the subject of the patent-right. The real object of the Patent-law was to add a new manufacture, and to increase the industry of the country by the protection of useful inventions. But how far that was carried out he need not stop to inquire. And it often happened now that protection was granted not to the real inventor, but to some one else. The line which separated the man who made a failure from the man who made the lucky hit was very narrow. There was a great deal of chance between the man who just hit the mark and the man who just failed. He strongly advocated the employment of eminent scientific men, the establishment of a museum for the reception of models, and the delivery of lectures on these models.

Mr. Wm. Smith strongly objected to changing a system, however defective it might be, for one he knew to be utterly worthless as the American system was. It was a delusion, a mockery, and a snare to compare that with the English system. He would rather go to the French system of granting patents to every person who applied for them. The appointment of a Board of Examiners, like that of the American system, was too absurd to merit discussion. They were complaining of the great cost that inventors were put to, and yet they were going to charge the country with the administration of a bad system at an enormous cost. Nothing could be worse than the American system. Mention had been made of the American Patent Museum, but it was worthless from beginning to end. Every inventor was called upon to supply a model of his invention, which should not exceed 12 inches square. But how many inventions of any merit could be properly illustrated within the dimensions of a cubic foot? Then as to the deposit of the models. They were to be deposited at the time of the application; and every one knew that inventors were not then in the best position to give the country the fullest details of the working of their inventions, and to guard future inventors against shoals and quicksands. With regard to the obligation to grant licenses, that had some merits no doubt, but it also had disadvantages. But every inventor who enjoyed protection from the State ought to be compelled to put his invention in practice within a limited period, as they were obliged to do in France. As to the question of cost, it had been stated that the English system was the most costly, being £25 in the first instance and £175 altogether. But when matters were taken into consideration, such as provisional protection, cost of searches and such like, which were often necessary, the amount was nearer £100 than £25 in the first instance. As to the examination, he thought the advocacy of that by the Inventors' Institute would do a great deal of harm. The substitution of the American system would be most objectionable. If there was a better staff of well-paid men at the Patent-office under Mr. Woodcroft, who was a very able man, to exercise a strict supervision, and use a little more care in the matter, there would be a far better administration of the Patent-law. He did not at all agree to the proposal to substitute a Board of Examiners for the present system. The ordinary mode of proceeding in connexion with the application by an English inventor for a patent in the United States involved frequently the necessity of taking out four, five, or six patents for that which in England had been done under one; and in the case of the application by Saxby and Farmer for a patent for their interlocking gear, it was suggested that no less than fourteen applications should be made for that which in England had been patented under one specification. Where then was the boasted cheapness of the American system, if you had to multiply the £7, which an American patent was said to cost, by 14? But that was not all. The amount of expense consequent upon the reference backwards and forwards to the Examiners, and the necessity of the inventor being represented by counsel, greatly enhanced the cost; and he protested against the American system altogether.

Mr. **Theodore Aston**, Q.C., commented upon some alleged omissions in the paper under discussion, and said that Mr. Samuelson in his remarks had stated that Mr. Bramwell had omitted to give sufficient weight to the fact that neither in Holland nor in Switzerland were patents granted. He also stated that patentees in England were, in consequence of the absence of patents in Holland and in Switzerland, enabled to place certain trades at a disadvantage, and he especially referred to the sugar-refining trade. Mr. Samuelson also referred to Mr. Macfie, who had distinguished himself by his opposition to patents, and who had addressed a letter to 'The Times' on the subject. But that letter very carefully abstained from giving any single case in which the sugar manufacture was interfered with by the existence of English patents. Mr. Macfie neither stated the existence nor the manner in which the interference took place. On a former occasion he did give evidence on the point before the Patent Commission. Mr. Macfie was examined by Lord Overstone, who put this question—"There being 400 patents now in existence affecting your trade, some of which are made use of by you, do you find that the existence of these patent-rights creates impediment, and interruption, and inconvenience in the prosecution of your business?" Now observe the answer:—"Not in the smallest degree; but if patentees were as troublesome as they might become under a change of the law and with a broader organization, we should find our business so uncomfortable that it would be almost necessary to retire from it. Every one of those parties might come and allege that we were infringing some patent, and might bring us before a court, as that person did to whom I have referred."

The state of matters with reference to interference with trade, as far as he was aware, had not altered since the time he gave that evidence, and he was quite sure that the amelioration of the system, which they all looked for, had not yet come. With regard to Switzerland, how did it act? It was quite true that, being, as it were, at the door of the market, the Swiss manufacturer was able (not having transport to pay, and not having high wages and the difficulties of strikes to contend with) to manufacture machinery at a lower cost than an English manufacturer could supply it to a South-German customer. But how did this act in fact? An eminent Lancashire firm who had been accustomed for many years to supply South Germany with machinery, supplied looms to two manufacturers in a very well-known town in Saxon Switzerland, supplying them under cover of a South-German patent. This patent was on the eve of expiring, and the Lancashire firm knowing that under these circumstances there would be competition from Switzerland, as firms there were known to be very desirous of entering upon that market, they were on their part desirous, in some way or other, of holding their own. It happened that the Lancashire firm were able to make very great improvements in looms that year, and the consequence was that the productive power of the looms they had already supplied to the German manufacturer might be improved by these alterations to the extent of 25 per cent. They took out letters patent in the South-German States for these further improvements; but when they went to supply them to the manufacturers they found that one of them had been making very extensive alterations in his establishment, and had got a large building prepared with new looms which he had obtained from Switzerland. The representative of the Lancashire firm looked at them, and then spoke to the proprietor of the mill, saying, he saw that they had got part of their castings from Lancashire and that the looms were copies of theirs. Oh yes, he said; he did give a loom to the Swiss maker, and he took a copy of it. To this the traveller replied that it was a very ungentlemanly proceeding, but that if possible they must get over that difficulty. He then told him that they had further improvements which increased the producing-power of the looms 25 per cent. more; but that those improvements he would not allow to be put to his old looms, nor would he allow any one else to add them, but that he would supply all other competing manufacturers with them, and that they would be enabled thereby to increase their production 25 per cent. The manufacturer replied that he had a contract with the Zurich manufacturer, who was bound to give him looms of equal producing-power to the best looms of the Lancashire firm, and that in case they did not do so the looms were to be sent back again. The Lancashire representative replied that he was going to Dresden to supply his competitor with them, that they would be added in a fortnight, and that he would then return and see him. When he did return and saw this German manufacturer he at once ordered the improved looms. But what was that owing to? Simply to the fact that having these improvements at hand, and having a patent which would enable the English manufacturer to compete with the Swiss rival upon broad fair terms, he was able to hold his own. Without a patented property in his further improvements, the English manufacturer would not have been able, considering the difficulties under which he laboured, to compete with his rivals, who came in at an advantage, having had the benefit of his experience and not having to pay transport.

It was worth while to consider to what extent patents from abroad bear any ratio to those taken out in the United Kingdom. Taking an average of three years, the number of patents granted for English inventions was about 3300, of which about 680 were for communications from abroad, so that the proportion of foreign inventions introduced to home inventions bears the proportion of about one fifth. As to these, at least, it must be said the country was richer by the addition, owing to the existence of the Patent-laws.

It is often alleged that of the total number of patents granted considerably the larger proportion were for inventions of no practical utility. This was easily tested by considering the number of patents kept alive at the end of three years and at the end of seven. At the end of three years 753 were alive; therefore it might be said these were reasonably good inventions. At the end of seven years 201 were alive. Therefore, out of 3300, 200 stood the test of seven years' trial, or stood the payment of the extra £100, and they might fairly be called good substantial inventions. As to the surplus of £95,000 alleged to remain when the general expenses of the Patent-office had been defrayed out of its annual income, it must be remembered that £28,000 really consisted of stamp-duty, which was a revenue-tax which the Government had as much right to put upon the parchment conveying the patent-right as upon any other parchment or deed. Government always meant that there should be two distinct species of payment—one for fees and the other for a revenue-tax; the latter was £5 upon the warrant, £10 upon the three years' payment, and £20 upon the seven years' payment. Those taxes amounted in round numbers, for all the years that have passed since the beginning of the law, to £184,700. That was a large sum for the Government to take for stamp-duty. But the aggregate surplus from which that deduction was made was no less than £1,100,203. Therefore, deducting what the Government might legally claim, namely £184,700, there still was left the large surplus for disposal of £913,500 for the requirements of the Patent-office, as was intended by the Patent-law, and this surplus may be expected to be increased every year by about £70,000. If that be so, once grant that it is advisable that expenditure should be incurred for the object of improving the system, there were the means.

He did not agree with the speaker who said the Commissioners were paid for doing something they did not do; for the fact was the whole system, as regarded the duties to be performed by the Commissioners, was tainted by the defect that they were expected to do all their duties gratuitously. Neither the Lord Chancellor nor the Master of the Rolls received one single shilling, and the Attorney-General and Solicitor-General were really not paid the official salaries allotted to them out of the patent-funds for their duties as Commissioners, but for the opinions they gave on State questions; and as the Government would not pay them properly as legal advisers of the Crown, their official salaries were made a charge upon the Patent-office. The Commissioners had to a large extent been blamed for not doing duties for which they were paid, but they were really paid nothing.

He would recommend that patentees should remember that the reason, when they go into a court of law, they were unable to support their rights was, that their title-deeds were bad. If a patentee would take the trouble to insure that the invention he has made was properly described in his specification, which he would call his title-deed, and then would take that into a court of law, he believed that in nine cases out of ten he would find no difficulty in enforcing his rights. But unless he does that, and takes care that he does not put in his specification claims which he could not support, in order to cover wide ground, he will destroy his patent, and when his counsel takes his case into court he finds he cannot support it.

Mr. E. A. Cowper thought there was one argument Mr. Bramwell had hardly touched upon, although he had named it. There were laws in this country for the protection of life and property; indeed it was sometimes remarked that we think more of the protection of property than we do of life or, at all events, of limbs; but what would be thought if it were open to any one and every one to take from a man a field of wheat grown on land he had recovered from the sea at great cost and perseverance? Just so an inventor worked and recovered from the boundless sea of ignorance the means of supplying in greater quantity, at a cheaper rate and of a better quality, all the infinite variety of articles and manufactures that go to make up a nation's wealth. It was an every-day fact, and one admitted on all hands, that the laws of patent property must be carefully adapted to the special circumstances of that property. So clever men, men more educated or original in their ideas, were at once acknowledged to have a property in their thoughts; and, because others want them, they readily give them protection by copyright, not for fourteen years only, but for their whole lifetime. So another class of men work with their original thoughts in another direction, having a more practical tendency, and they equally have a right to have their labours protected to them for a few years, at all events until they can remunerate themselves.

He would mention the case of a workman who invented a very valuable improvement in the mode of working the slide-valves of steam-engines, and it was particularly valuable when engines had to be reversed suddenly or, indeed, at all. So valuable was this invention that it was all but universally used in all locomotives and in all steam-boats. Now this workman made a mistake, for instead of going to the Patent-office and paying five pounds, he showed it to a gentleman who gave him five pounds, he not thinking it a very valuable thing at the moment. Now it was a great pity that this man did not have the benefit of the Patent-laws, as he fully deserved to reap a fraction of the great good he did by his invention, which at the very lowest valuation could not have been worth less than £20,000.

Another case he was even more intimately acquainted with. Years ago he had designed the common fog-signal, now universal on all railways; but he did not patent it because he thought, and thought wrongly, that it would be more quickly brought into use if left open. The result was that he received next to nothing for the invention, and it was not taken up so quickly as it ought to have been, by probably two years; and great loss of life occurred during that time, which might have been saved if it had at once been patented and a factory set to work to make and push the invention more than he could afford to do, having no security of reaping advantages from it, as he had no patent.

It had been observed that inventors sometimes hit upon a lucky invention, and reference had been made to the improvement introduced by his father into printing-machinery. Certainly this was an invention which had created quite a revolution in the dissemination of information; but he knew that his father had worked for weeks, months, and years, and had spent many hundreds if not thousands of pounds in his experiments, until at last the day came when his partner announced that he would risk £5 more upon it, and that was all. Happily the desired end was accomplished just within the £5; and it was very well to point to the lucky hit which came at the last moment, but what of all the time, labour, and money spent previously? It was a small thing when it was done, something connected with the inking-apparatus; for several printing-machines had been constructed which would give a very good impression if time could be allowed to ink the type by hand, the difficulty being to effect the proper distribution of ink. This was at last accomplished by its being distributed latitudinally and longitudinally, instead of one way only, and then the thing was done.

It had been said inventions might be worked secretly by the inventors; but this was not the case, except in very rare instances. He would name two: one was a very peculiar case; it was not quite such a process which a person could carry on by himself, because steam-power was wanted for it, and so the inventor had a steam-engine and boiler, &c.,

put up, and had the shafting run through a wall into his secret room; and, in order to prevent any one from seeing through, he ran the shafting through a good stuffing-box, so that all view of his operations was prevented, and he and his engine-driver went in and out as well-dressed gentlemen, and very few persons suspected what was going on. The other case was that of a manufacturer of the hair-springs of watches, who worked with his son at making hair-springs by drawing them through dies after he had hardened them; but the amount of work he could do was very small indeed, whilst the invention of drawing steel wire after hardening is one of very great importance indeed. All wire for pianofortes was so drawn, and some years ago was known as "Austrian Music-wire," and was very expensive, though now it can be made very cheaply, as all steel ropes for steam-ploughing are made of this hard-drawn steel wire.

He would, however, put by the question of secret working—for what manufacturer would employ a large number of workmen to work secretly?—and he would ask, How could the country reward the vast number of inventors who were recorded in the Patent-office documents except by letting each man have a share in the products of his own invention? He had taken the trouble to calculate out the average lifetime of a patent, taking into account those on which the third year fee is not paid and also the seventh year, and found that the average life of a patent was only three years and one third; so that, on the average, a patentee has but a short time of it, though of course the really valuable patents are kept alive by the owners, otherwise there would be no good prizes to induce inventors to go on improving. It was a most remarkable thing that the Patent-law of 1852 had never been fully carried out. It said that "the Law officers, together with such other person or persons as Her Majesty shall appoint, shall be the Commissioners of Patents." Now Her Majesty had never been advised by the Government to appoint these "other persons," and of course had not done so; it was, no doubt, a very great omission, for if the law were thoroughly carried out almost every evil would vanish.

Mr. T. R. **Crampton** said, notwithstanding all that had been said against the American system, he believed there were some good points about it, particularly the preliminary investigation, without which there would be many more applications. People could not be expected to be infallible; and his experience of American patents showed him that these investigations were often very useful. You could easily improve an American patent; you could also obtain what was equivalent to provisional protection; and you were not bound, as had been stated, to deposit a model on making your application—a certain time was allowed for so doing. There were many points, however, in which the system might be much improved, as, for instance, that mentioned by Mr. Smith, of dividing a large subject into a great many small ones, for which separate patents must be taken out.

With regard to inventors being rewarded by honour, he was supposed by his friends to have had some little experience in these matters, and to be as well able to work for nothing as most people; but he must confess that he had always looked to a profit. He did not mean to say that he had not a certain *amour propre* in making an invention, and a feeling that he had done something whereby he gained the good will of his fellow men; but to suppose that any man in his senses would work at a subject for years simply for the sake, say, of being knighted was absurd. Such honours, if conferred on a poor struggling working man, would be a positive injury to him; so also would it be injurious to the middle-class man, unless he had independent means enabling him to maintain his proper social position. In fact, he could not conceive any honour you could do a man which would justify him in spending his time and money for the good of the community. For about six years he had been investigating one particular subject, working at it almost unceasingly, with the command of every facility requisite for insuring success, and was he to be simply rewarded by honour if he succeeded? It would not repay him for his time and money. Many persons thought he had succeeded in some things—in making small coal go further than large, in automatic feeding apparatus, in puddling iron effectively by machinery, and in making steel in a Siemens furnace from the commonest class of iron equal to the best qualities. If he were to be rewarded simply by honours he should say he was much obliged; but he should never have devoted his attention to these subjects if he had not a prospect of a more tangible return.

Sir Francis Knowles, Bart., thought there were one or two practical points on which great improvement could be effected in the present system. In the first place, he did not consider six months was long enough for maturing the specification in many cases, and thought it would be better if there were an intelligent Board of Commissioners who had power at their discretion to extend the time within which the patent must be completed. This, he believed, would greatly assist the poor inventor, who had been so much spoken of, in finding a good Samaritan who would assist him with capital to carry out his ideas; though he feared the good Samaritan too often played the lion's part, whilst the inventor or patentee was reduced to that of the jackal. But, again, when the patent was obtained and the inventor's rights secured, they were very inefficiently protected. Too often a speculative manufacturer came forward and used the patent without paying a farthing, relying on the inability or reluctance of the patentee to embark in expensive litigation. Then if the latter did commence an action, the infringer was allowed to come into court and plead that the invention was not new, and that it was not useful, though he might be using it every day and making money by it, and professed to be acting in the interest of the public. But if such were his real motive there was a process prescribed whereby he could get the patent repealed by obtaining the fiat of the Attorney-General, and proceeding on a *scire facias.* The truth was, however, he did not want any thing of the kind, but simply desired to participate surreptitiously in the advantages of the patent. He would suggest, therefore, that the validity of a patent should not be allowed to be contested except by a *scire facias*; then, if the patent were a good one, the only issues in case of infringement would be the fact of the infringement and the amount of damages. Such an alteration would, he believed, get rid of more than three fourths of the patent litigation.

In conclusion, he desired to pay his tribute to Mr. Bramwell for the admirable way in which he had vindicated the claims of British genius against hollow sophistry; and if any other sanction were required he would appeal to the higher and older one, "Thou shalt not muzzle the ox that treadeth out the corn." And if not the ox, certainly not the man. He had also vindicated the claims of mind against matter, for which there was prescription older than that of any hereditary property; for from the former the latter derived all its value, and without it would be as valueless as when it formed only the hunting-ground of the wild beast or of the naked savage.

Mr. JOHN IMRAY said he wished they had had the benefit of Mr. Bramwell's assistance when, some years ago, they had to meet Mr. Macfie and some other gentlemen, who were strongly in favour of the abolition of patents. Happily, however, they were able so far to influence the House of Commons as to postpone this abolition; and since then a strong reaction of opinion had set in, so much so that during the present discussion there had seemed almost a unanimity of feeling that patents ought, in some shape, to be maintained. The only dissentient had been Mr. Lloyd, who had brought his great powers of criticism and satire to bear on the views Mr. Bramwell put forward, and said that the inventors ought to be satisfied with honour and glory for their reward. This was, however, merely the sentimental view, which was hardly worth serious discussion.

Reference had been made to George and Robert Stephenson, and to the statues in Euston Square; in other words, when the inventor asked for bread he was offered a stone. But Mr. Lloyd forgot to mention that both these gentlemen made large fortunes besides. At the same time he agreed that when the Lord Chancellor and other legal dignitaries filled honorary offices only, and when learned counsel of great ingenuity and acumen were ready to conduct cases in law-courts for the honour of the thing and for the love of justice, inventors might be asked to labour without any more solid remuneration. But, leaving the realm of sentiment, it occurred to him that a patent was very much in the nature of a lease. If a landlord had a piece of waste ground, he would let it at a very low rent for a certain term to some one on the condition that he put so much labour and capital into it, so as to make it fertile; and in the same way the State agreed with an inventor that, for a certain time, he should have an exclusive privilege in return for his time and trouble. It was therefore no longer a question of abstract right, but of simple contract; and the question was, whether it was not better for the State to enter into these contracts, and so encourage inventions, rather than let the ground lie waste.

He was an inventor himself, and some of his inventions had brought him something better than the stone Mr. Lloyd wished him to be contented with; he was also an expert, often employed in patent-cases either to support or break down a patent, besides which he was a patent agent, and had had some hundreds of specifications pass through his hands. He did not speak, therefore, without some knowledge of the subject; and his experience was that almost all the litigation, trouble, and annoyance connected with patents (and it was but a very small percentage) arose from the patentee, or those who acted for him, not properly defining the limits of the invention. It was just as if a person let a piece of ground without a proper plan, or leaving an indefinite boundary line, so that no one could say exactly how far it extended. He did not care for an examination as to the novelty or utility of inventions, but he did want to see each one so accurately described that there could be no doubt as to what it included, so that every one might know when he was trespassing and when he was not. It was not right, in his opinion, for the State to take fees from inventors without doing something in return; and he should like to see associated with the present Commissioners a properly qualified body of gentlemen, whose duty it should be to examine the specifications and see that they were properly, accurately, and distinctly drawn.

He could mention instances in which men, who had sworn before the American Commissioners that they intended at such and such a date to make an invention, had been able to keep out the man who had actually made the invention; and he could only say that if such a system were followed there would soon be an end to inventions altogether.

Dr. Collyer, after some remarks on the Vienna Congress, went on to the question of compulsory licenses, which, he thought, meant depriving a patent of any commercial value. It often took an inventor ten years to complete an invention, and during this time he had to meet with all kinds of rebuffs and insults; and when at length he succeeded, he was entitled to a reward. As an American who had been connected with the Patent-office, he did not consider that the objections made to the American system deserved any reply. The fact that two, three, or four bad patents had passed, was no reason for depreciating a good principle; and he was satisfied that good service was often done to an inventor by having his invention examined by competent men who could show him where his fault lay. Many a man was quite honest in supposing that he had invented something which had been known years before, and in such cases the assistance of the examiners was valuable.

The discussion was then adjourned to the Friday evening following, December 18th, at 8 o'clock.

Friday, 18th December, 1874.

DISCUSSION (*continued*).

William Newmarch, Esq., F.R.S., Corresponding Member of the Institute of France, in the Chair.

Dr. **Siemens**, F.R.S., wished to be allowed to say a few words with regard to the Vienna Congress, which had been referred to at the last meeting, as he had taken a somewhat prominent part in connexion with it. The idea of that Congress originated with Baron Schwartz Senborn, Chief Commissioner of the Vienna Exhibition; and invitations were issued to all nations, in the name of the Austrian Government, with a view to establishing International relations regarding the Patent-law. However, before the Congress assembled, the Austrian Government, like Frankenstein, became somewhat alarmed at their own creation; and the Congress, instead of being an official one, was simply an assemblage composed of representatives of the Austrian and other Governments in an unofficial capacity, of manufacturers, and others, especially the jurors who had attended the Vienna Exhibition, Baron Schwartz being made the Honorary President. He (Dr. Siemens) was summoned to Vienna from Carinthia to conduct the business of this heterogeneous body, and amongst his presidential duties was that of explaining, if not translating, the speech of any member of the Congress into any other of the four languages which were in use there. It was evident, therefore, that his position was not at all a bed of roses; and if in the end the Congress arrived at any resolutions which would stand the test of scrutiny, and form the basis for further efforts in the direction of an International relationship with regard to Patent-laws, he thought it might be said they had not met in vain. Mr. Webster, Q.C., who represented England at that Congress, worked most arduously in the endeavour then made to arrive at some reasonable conclusions, and he had since worked still more arduously in putting the transactions of the Congress before the English Government in an intelligible form. He believed that a better law would shortly be introduced into the German Legislature, which would compare favourably with that of other countries; and in this country also he believed legislation might be expected from the present Government.

With regard to the English Patent-law, he might say that with all its faults he loved it still. But though its administration left much to be desired, there were elements in it extremely advantageous both to the inventors and to the public. One of the chief of these was that the tax was progressive, not by driblets, as was the case in France; but there were fixed periods during which the patentee might try to give life to his invention, and if at the end of the period it did not answer, he might relinquish the claim by declining to pay any further fees.

The American Patent-law had certain advantages of its own, and he thought the preliminary examination a good institution, though both in America and Prussia it was carried beyond the limits of usefulness. One speaker had compared an invention to a reclamation of land on the sea-shore, and he understood him to draw from it the inference that the right of an inventor was indefeasible. Now he was strongly opposed to the idea of indefeasible right; and taking the same idea he would say that, though a man was entitled to the fruits of his labour in gain of ground from the sea, there might be circumstances under which it might not be desirable, from its effect upon the tideway or otherwise, to make the reclamation. He would therefore rather compare an invention to a new-born child, which might become a man of great power, but in its actual state was utterly powerless. The parent of the child had not only rights but important duties; and so with the patentee, he had a public trust to perform; he ought to carry the idea which presented itself to him into practice and give form and substance to his invention. For so doing he was justified in taking his share of the benefit which it might produce, but for a certain time only, after which it would be given over to the community. He thought this was in substance the view put forward by Mr. Bramwell; and, in conclusion, he congratulated all those interested in this important question on having had the advantage of hearing this most able address and the almost equally valuable discussion which had followed it, for both, he believed, would lead to most important practical results.

Mr. H. Cole, C.B., said:—In the few remarks I am about to make, I intend to avoid the discussion of general abstract principles, and to confine my observations to some facts and practical points. Even then I do not intend to bring forward all the many details of this complex question and its numerous ramifications. It is more than twenty-four years since the Society of Arts began and carried out a successful agitation against the bad Patent-laws which then existed. On the facts of the case collected by the Society, Charles Dickens published "A Poor Man's Tale of a Patent" in 'Household Words' of the 19th Oct., 1850, which circulated in thousands—hundreds of thousands—throughout the country, and gave the death-blow to that bad system. This humorous tale with its true facts got rid of the "whole gang of hanapers and chaff-waxes"—England having been, as Dickens said, "chaffed and waxed sufficiently." There is still a little chaffing and waxing in the obtaining a patent which might be well dispensed with. Under the system before 1852 about 700 patents yearly were issued in the United Kingdom; they yielded £66,000 a year in fees. The broad principles of reform which the Society advocated were:—simplicity of registration; a graduated scale of fees from £5 to £100, payable at fixed periods; a full publication of all specifications, with proper indexes; and, lastly, that "the surplus profits, after paying office expenses, should be directly applied to some public purpose connected with invention, but not carried to the Consolidated Fund." The Patent Act of 1852 in the main adopted these principles; and the result last year was as follows: 4294 applications were made for patents, *i.e.* patents have been sixfolded under the present law; of these, only 2906 obtained Letters Patent, and as many as 1320 were not finally completed. The gross total of fees realized £144,761, of which £95,284 went to the Treasury, whilst Smeaton's engine was broken up for old iron. All commendation should be given to Mr. Bennet Woodcroft for his works of publication and indexing. During this period some scepticism in defiance of old practice and the opinions of political economists like John Stuart Mill and others has been expressed, questioning if it be good public policy to acknowledge any rights of invention at all. This scepticism has declined of late, and I think the working men must have altered the views of the late Lord Chancellor. However wavering you may be in trying to form a dispassionate judgment on a difficult and abstract idea, I think the conclusion must be that the inventor's rights ought to be protected. It seems to me that Mr. Bramwell's paper, Mr. Fitzjames Stephen's remarks, and the able speeches of others in the late discussions, and, above all, the evidence afforded of the strides made in manufacturing industry through inventions, renders it quite unnecessary now to enter upon that question.

The points to which it appears to me profitable to direct attention are:—What improvements can be made in the present law and practice? I assume patents for inventions will continue. (1) Ought the inventor to have an unchallenged right of registration of his invention at a cheaper cost than now? (2) As all the onus of defending rests upon him, ought he to have that right unquestioned when applying for registration? (3) Ought any kind of Papal infallibility to be called in to pronounce a judgment on the novelty and goodness of his claim? (4) As at present, ought there to be graduated rates of fees, and ought these to be of the same amount? (5) Can law proceedings be simplified and cheapened?

As respects the first question, the fee of £5 is not high in itself; it might be lowered, but this would not materially affect the subsequent cost of taking out a patent, because the chief part of the cost is the agent's charges. It might perhaps be worthy of consideration if these charges could be reduced by some official forms which the ignorant poor inventor could fill up, under the guidance of a recognized agent, at a fixed payment. As respects the second question, I hold it quite impossible for any tribunal to decide satisfactorily to the public if a patent should be granted or not granted. It would be fatal to inventive progress to give any tribunal such a power, and I am convinced the public would never tolerate it. How long would a tribunal of scientific doctors stopping an invention for crossing the Atlantic, or forbidding the plans for building a Crystal Palace, last? But the Patent-office has, by the present law, sufficient powers, and might perhaps give a report on certain facts at a reasonable fee upon the request of an inventor for his guidance. Such a report should have no legal force until it was proved by a court of law to possess it.

On the policy of renewed terms for patents at graduated fees, I think there cannot be two opinions. It is a simple, effective, and self-acting process for getting rid of useless patents, and should be certainly maintained. In my opinion the present fees are not too high if they were appropriated for the benefit of invention; but they are greatly too high if treated as a tax payable to the Exchequer. I dare say the legal proceedings arising out of patents, like most human arrangements, could be improved; but, as Mr. Fitzjames Stephen has shown, the very nature of the subjects is so complex, when inventors, capitalists, and manufacturers are all quarrelling, that much cannot be hoped for in this direction. I abstain from discussing the limitations to be put on the rights of inventors by granting compulsory licenses. I think there ought to be compulsion by arbitration. They seem to me details for a small committee rather than a public meeting to settle. I have no doubt at all that any surplus fees ought to be applied, under legal enactment, to the support of a museum of scientific inventions worthy of this great country. The museum should be under regulations, so that the Treasury ought not to have the power to refuse a miserable £150 to preserve

Smeaton's pumping-engine, which was at work in 1766, ten years before Watt's steam-engine. I have a conviction myself that the present times are propitious for reconsidering this question of patents, of vital importance to the manufacturing industry of this country, that the present Chancellor of the Exchequer and the Lord Chancellor will deal with this question as statesmen, and this Society, inventors, and capitalists, and the public will hereafter owe the present Government their gratitude.

Mr. T. **Webster**, Q.C., wished to refer to only one matter which had been a little misunderstood—namely, the question of the compulsory licenses. It had never been proposed by anybody that any one could come in at his pleasure and share the property of an inventor. What was intended and expressed in the resolution passed at Vienna was that, in certain cases in which the public interest required it, there should be a grant of a license to a competent person on reasonable adequate compensation being given. And he wished to call attention to this consideration, which had not yet been adverted to, but which was very much pressed at Vienna—namely, that this question of compulsory license was essentially a poor man's question. It was well known in this country, though the Americans had not yet found the pressure of it (and the same necessity did not arise there, owing to the examination system, which prevented many useless patents being granted), that it was often to the interest of capitalists to buy up patents to prevent their being worked. In that state of things the law ought to step in and say that such dog-in-the-manger conduct should not be allowed, and that it should be impossible for a patent to be taken out in this country whilst all the articles made under it were manufactured abroad. It was that mischief which was felt very much in some cases, though, in the majority, he believed the evil was more imaginary than real, which led to the strong feeling in favour of a compulsory license, and induced the Congress, though at first very adverse to the idea, ultimately to adopt the resolution by a majority of three to one. And he felt satisfied that if the working men of this country, against whose interest it was supposed this would act, would only look at the matter in the proper light, they would see that this reform was essentially in their interest. He would not occupy the time of the meeting further; but he thought Mr. Bramwell might be congratulated on having added a great number of considerations which probably had never occurred to any one before, and he believed the result would be that something would be done towards that reform in which the Society of Arts had taken part so long ago as a quarter of a century.

Mr. W. **Griffith** thought one observation which had fallen from

Mr. Samuelson was rather calculated to produce a false impression as to the legal state of the question. That gentleman said that the present system of administration might be improved by calling in other persons to administer it. That might be perfectly true; and yet it hardly touched one of the essential evils which at present existed. Nobody could have higher respect for the act of James I. than himself, and, as had been said, it showed the patriotism of the people of that day, and the justice and generosity with which they treated the inventors of new and useful articles. But what was the meaning put upon those words "new and useful" at the present time. According to the practice of the Law-officers of the Crown patents might be granted for similar objects. It had been decided by the House of Lords, in the celebrated case with regard to Betts's capsules, that, though the specifications were identical, two patents might be granted to different persons. Now was not that absurd; was it possible that when one thing was new, another thing described in exactly the same way could be new also? Yet such was the present practice; and in the Law reports for the present month he found that the great seal had been affixed to two similar inventions upon the same day. This was not altogether a theoretical objection; for if you had patents granted to two persons who brought forward things exactly similar, there was sure to be much litigation afterwards, and the Patent-law would be abused, and rightly so, for being so wrong in its principles. Only the other day, at the Patent-Museum, he had put into his hands the last part of the evidence given before the House of Commons Committee, and he there found that both Sir Roundell Palmer and Mr. Grove said that the present law was so cumbrous and unworkable in its character that sooner than it should continue to exist they would have no protection at all. If patents ought to be protected, and if a person had a right to reap the fruits of his own labour, it was surely wise to advocate such reforms in the law as would separate the abuse from that which was really useful. He did not think anybody could contend in the present day on abstract principles that it was not just and expedient that such rights should be protected. If the farmer who sowed a field had a right to reap the fruits, and if a man who laboured with his hands had a right to his wages, he who laboured with his brains had also a right to receive the fruits of his labour. On these grounds, and also because it was obvious that if they did not grant protection inventors would be running away to other countries and capital would follow them, he considered it both expedient and just to extend protection to inventions; but at the same time, while supporting this view, it was highly desirous to remove that which was useless and which brought that which was so good into so much disfavour and contempt. He therefore thought it would be wise for the present meeting to appoint a committee to consider the parliamentary aspect of the question. The Society had great influence, and if that were brought to bear on the Secretary of State, he thought they would be likely to attain the ends they had in view.

Mr. **William Smith** asked if Mr. Griffith knew for a fact that because the seal had been affixed to the two patents with the same title that the specifications were the same, considering that the latter could not have been published at the time.

Mr. **Webster** said it was notorious that the anomaly referred to did happen.

Mr. **Griffith** said it was so laid down by the House of Lords in Betts's case, and two cases of a similar kind were referred to in the authorized reports.

REPLY.

Mr. **Bramwell**, in reply, said, I am afraid that by this time you must be weary of the subject of protection for invention; but at the risk of causing you to be still more weary, I will ask your kind indulgence for some considerable time, while I reply to the various observations that have been made in the course of the discussion, and I will venture to demand your permission to pass, in one or two instances, beyond the boundaries of this room, and to be allowed to comment upon remarks which have been made elsewhere.

In the very outset of my reply I wish to clear up a misapprehension as to my views under which some appear to have laboured. Mr. Samuelson said that I regarded matters too much *couleur de rose*, and others have said I appear to be of opinion that our present system is the best of all possible systems, and that no alteration is wanted. This really is not so, as any one may see who will take the trouble to refer to the very first page of my paper. I stated there that two things might well be considered—the one, what should be the nature of a Patent-law; the other whether there should be any Patent-law at all: and then I went on to say that as it was impossible to discuss these two subjects in one evening, and as it was idle to investigate details when the very principle was in doubt, I would devote myself to the consideration of the broad question whether or not there should be a Patent-law; and then I added that as I intended to discuss that question without entering upon the merits or demerits of the present law, it was only fair that I should, as against myself, take the law as it stood, and should consider whether, even with such a law, it was expedient to have protection or to do without it.

Before my reply is concluded I think I shall have shown to you, not only that I believe the present law (or rather, as it would seem from the statement of Mr. Samuelson, the practice under the present law, and not the law itself) could in some respects be altered with advantage, but I shall also show to you that I have had this subject of amendment under my consideration for years, and that I have borne my share in suggesting what the amendments should be.

Notwithstanding the many kind things that, in the course of the discussion, have been said of my paper, I am in considerable doubt whether I ought not to apologize for having brought it forward, and whether I ought not to do so on the ground that such a paper was unnecessary, and, worse even than this, that it was suggestive of a going back. It is in this sense at all events that I understood Mr. Hinde Palmer's observations. You will remember he expressed his surprise that a paper should have been written which treated as still open to doubt the question whether there should be protection for invention, whereas he believed that question had long been settled in the affirmative.

Any mortification I might experience on finding that I have written an unnecessary paper is more than outweighed by the pleasure of hearing, from a gentleman in Mr. Hinde Palmer's position as a recent member of the Legislature (and a member who, only three years ago, had the whole subject so thoroughly before him in his position of one of the Committee which sat in 1871), that the principle of protection is firmly established. Mr. Hinde Palmer certainly appears to be justified in his position by the general concurrence of the speakers who have addressed this meeting, and also by the tone of the press in their notices of these proceedings here. I repeat I shall be most heartily glad if Mr. Palmer is right, and if this paper of mine is unnecessary, even though it would make me responsible for having uselessly occupied your time. But I cannot say I am quite assured that Mr. Palmer is right; I cannot forget that no longer ago than 1869 Mr. Macfie moved in the House of Commons, "That, in the opinion of this House, the time has arrived when the interests of trade and commerce and the progress of the arts and sciences in this country would be promoted by the abolition of patents for inventions," and that, although this motion was not pressed to a division, Mr. Macfie found no less a person than Sir Roundell Palmer (who, since then, as Lord Chancellor Selborne, has been at the head of the law in this country) to second that motion, and he also found Lord Stanley (the present Earl of Derby) to speak in his favour. I will not at this moment say any thing further about Mr. Macfie, although I shall have occasion to do so before my reply is concluded; but I will ask the meeting to consider the gravity of the opinions of men like Lord Selborne and Lord Derby. The latter nobleman is a member of the Cabinet, and although his duties in that Cabinet are such that presumably the subject of Patent-law (except the question of an International law) does not fall within their scope, nevertheless it cannot for one moment be doubted but that the advice of a nobleman so distinguished in every way for uprightness, sound sense, and an earnest desire to do the very best that he can for the country, should be sought by his colleagues, and should have its full weight. Lord Selborne also, although now among the retired Chancellors, is a man whose every opinion must be listened to with the greatest possible attention, whether he be in office or not; and, so far as I know, neither Lord Derby nor Lord Selborne has ever since the debate of 1869 made any statement to warrant one in supposing that he has to the slightest extent modified his opinion upon the Patent-law question, or that he believes he perhaps was in error in supporting Mr. Macfie's motion, which, you will remember, dealt, as my paper does, not with details at all, but went to the very root of the question of patents for invention.

Now I am not, I am sure you will credit me, vain enough to suppose that, even if my paper ever came to the knowledge of Lord Derby, or was brought before the notice of Lord Selborne, any arguments I advance in favour of the maintenance of protection for invention would have such weight with those noblemen as to cause them to change their opinions; but may I not hope that the strong expression of sympathy with protection which the occasion of reading this paper has evoked from the public press as well as from the speakers here, will have its effect upon the minds of such men as these? for I believe both of them are quite capable of imagining that if they found themselves opposed to the views of the public (as shown by the majority of the press), they may be in the wrong, and may be induced to reconsider the subject; and even if they cannot bring themselves to believe that protection for invention is the best thing, they may still consider it desirable not to interfere with that which is evidently valued by the bulk of the community. As I have said, so far as I know, the opinions expressed by Lord Derby and Lord Selborne in 1869 have not been withdrawn by either. I believed when I wrote my paper, whether rightly or not

I am not now certain, that legislation on the subject of the Patent-laws was imminent, and I thought that I might do good by bringing before this Society, and, through its means, before the public, the expediency of protection for invention.

With your permission I will now say a few words upon the question of copyright. Lord Selborne, Lord Derby, and even Mr. Macfie see a great distinction between copyright in books and patents for invention, and they one and all would uphold the copyright while they would make an end of patents. Another great antagonist of patents, Mr. James C. Thorold Rogers, formerly Professor of Political Economy in the University of Oxford, although he perceives the great distinction between patentright and copyright, does not, as I shall shortly show you, uphold this latter form of protection with any vigour.

I had intended to consider the subject of copyright somewhat fully in my original paper; but I found that paper had reached to so great a length that I was compelled to make there only the most cursory allusion to the question of the relationship that exists between copyright and patentright (both forms of protection for mental labour), and even now I must treat the matter as briefly as possible. Those who distinguish between a copyright and a patentright use as one main ground of this distinction the argument employed by Mr. Rogers, in his letter to Mr. Macfie, at page 8 of the introduction to Mr. Macfie's book on the Abolition of Patents, which is, "that in ninety-nine cases out of a hundred the patentee is only a simultaneous inventor with a number of others, who lose their labour and ingenuity because one man happens to get in first. It has always seemed to me that the weakness of the inventor's case lies in the fact already alluded to. Hence the fundamental distinction between invention and copyright, though I am no fanatical admirer of the latter privilege." Thus you will see the opponents of a Patent-law allege that, while there is frequently simultaneity of invention in the improving of a machine or of a process, there never is and there cannot be, in the nature of things, simultaneity in the production of books; and therefore the opponents say that when you grant a copyright to A you don't inflict any injury upon B, who could never have written a book similar to that of A; while when you grant a patentright to C you do inflict an injury upon D, for he has made, or might have made, the same invention, but who, as regards obtaining protection, has been forestalled by C. Those who assert this simultaneity of invention, in doing so beg the whole question. They say, depreciating the merits of inventors, that in truth, generally speaking, the so-called invention is simply the means of supplying some new want, and that two or three persons can always find out how to do this. Indeed these objectors discredit invention, until they all but put forward the proposition that the real inventor is the want itself, which directly it arises is sure to be satisfied. But I don't believe this is true. On consideration it is extremely difficult to say, when a want arises, whether it is new. Wants always exist; and if at any time they are not pressing and clamorous, it is from the apparent hopelessness of satisfying them. Suppose, in the course of the next hundred years, some one were to invent a machine which would enable men to fly. The objectors of those days, should there remain any, would say, "Oh! there is no invention here; the patentee has merely supplied the want when it arose, and plenty of others could have done the same." But we of this generation are in a position to judge of the fallacy of such a statement, for the want exists now. We at the present day do want to fly, but we don't press this want because we believe it is one that cannot be satisfied; but would it be tolerated if within the next year a successful flying-machine were produced, that the deviser of that machine should be told he had not exercised invention, he had done nothing more than satisfy a want that had sprung up? It may be said that I have taken an absurd illustration in suggesting a flying-machine. Not so idle, however, after all. But assume the case of navigating balloons. This has been, to a certain extent, accomplished; it is an admitted want; many minds are directed towards it; but, so far from there being a concurrent supply of the want, not a single successful plan has yet been devised. We wanted the electric telegraph at the beginning of this century, but we didn't get it; and I shall have occasion to show you that the fish-joint was wanted for a quarter of a century before it was obtained. Thus it appears to me that it is nothing more than an unproved statement when opponents, in effect, assert that the true novelty is in the want, and not in the invention to satisfy it.

In my paper I spoke of the Giffard Injector as an instance of a substantive invention, and as an instance also where, from the mere inspection of the apparatus disclosing its nature, secret manufacture was impossible. A drawing of that implement hangs upon the wall, and an actual injector, and also one cut through the middle to show the internal construction, lie upon the table. I shall have to revert to the injector when considering the question of preliminary examination; but I bring it forward here as another instance that a want is not satisfied as that want arises. The principal purpose for which the injector is employed is the supplying of steam-boilers, and especially locomotive steam-boilers, with feed-water. Now the want of an improved means of supplying locomotive boilers with feed-water had existed ever since the opening of the Manchester and Liverpool Railway in 1830, and yet that want remained unsatisfied for a quarter of a century. Even supposing it to be the fact that there is in some cases simultaneity of invention, I do not see what argument this is for withholding a patent. You will remember that I have based my advocacy of protection for invention, not upon the individual right of the inventor, but upon expediency, having regard to the community at large. Looking upon the question in this light, one sees the gain to the community is that the thing should be invented and carried to the practical working stage; the fact that two men simultaneously and independently invent it does not increase the benefit in the least; all that the public cares for is that the invention should be brought to a working stage, and this being obtained the public does not consider whether the invention has been made once or twice. According to my view the public interest is satisfied so soon as a property in an invention has been given to the the first applicant, and it has thereby been made worth his while to develop that invention. It is clear therefore that the fact of simultaneity of invention, and the giving of the patent to one man of the two only, does not detract from the benefit to the public; but it is alone on the ground of benefit to the public, taken as a whole, that I advocate the continuance of patents.

I started by saying that I urged the continuance of protection for invention not on the basis of the rights of patentees, but on the wholly unsentimental score of expediency; and thus it is I am not so much impressed with an objection often made by the opponents of patents, that the giving of the protection to C when D had made the very same invention is a very hard case upon D, the second inventor. If C had not come first, D might have had the patent. To a certain extent it is a hard case upon D; it was his own fault though for not coming in time. But how do you make the case of D any better by destroying property in invention altogether? What is it you have done? You have secured that C and D shall be on an equality; but by what means have you done it? not by giving D any thing for himself, but by depriving C of what he otherwise would have had. I will ask whether, even admitting simultaneity of invention, the opponents of a Patent-law have shown to you that such a state of things affords any valid reason, even in the interest of the two inventors, for withholding protection from both; and whether the opponents have in the slightest degree grappled with the question that the public would suffer from its not being to the interests of either inventor, in the absence of a Patant-law, to develop his invention. Moreover the upholders of copyrights say that copyright does not interfere with the freedom of trade in the way in which patents do. This, again, I cannot understand. One man writes a book and is protected by his copyright, another man invents a printing-machine and is protected by his patentright. The book and the machine are both successful. A rival printing-machine maker wishes to make the machine, and he cannot on account of the patent; upon which the cry is raised of interference with freedom of trade. A rival publisher wishes to print the book, and he cannot because of the copyright; and although in this case printers and paper-makers are as much prevented from the exercise of their trades, as in the other case ironfounders and machine-makers are, yet the copyright is said not to be an interference with trade. Remember, further, that in the case of the machine the interference lasts but fourteen years, and that the power to interfere by means of the patent has been acquired at a considerable outlay in Government fees, to say nothing of the great cost of developing the original invention; while the interference by copyright is for the author's life *plus* seven years, be that life as long as it may; and as a minimum (however short the life may be) the copyright is for forty-two years. Further, the obstructiveness of patents is often urged. It is said the patentee is not now bound to grant a license; but is it not equally true that the owner of a copyright is not bound to license anybody? However valuable a book may be, the owner of the copyright may refuse to bring out a second edition; and without his sanction no one can do it, nor make a reprint of that book, until at least forty-two years have expired. Moreover this forty-two years' enjoyment of monopoly has been obtained at the mere cost of the gratuitous delivery to certain departments of a few copies of the work, and the monopoly of copyright extends to many foreign countries. Depend upon it the distinction between copyright and patentright is too subtle for the general mind, and that thus when the patentright falls the judgment of the public will demand that copyright shall not long survive. You will have observed that the first sign of this inevitable connexion between the destruction of patentright and of copyright is given by Professor Rogers, who significantly says, "I am no fanatical admirer of this latter privilege."

Thus much on copyright. I will now address myself to reply to the observations of some of the speakers; and foremost among them I must place Mr. John Horatio Lloyd. I am very glad indeed that the advocacy of the opposition to the principle of patents was in his hands. I say the advocacy of the opposition to the principle of patents, because Mr.

Lloyd, although he very candidly admitted that he believed, in the absence of any other reward, that some kind of Patent-law must remain, left us in no doubt that he objected to such a law upon principle; indeed his conversion, even as regards the question of practice, seemed to be any thing but complete, and more and more did this appear as he warmed in advocacy of the opponents' views: so evident did the hollowness of his conversion become that it elicited the remark from one of the speakers, "He who consents against his will is of the same opinion still;" and I am by no means sure that I ought not, after all, to rank Mr. Lloyd amongst the opponents to the practice as well as to the principle of a Patent-law: but to whatever extent his opposition may really go, I am, as I have said, glad that the advocacy of the non-protectionists fell to Mr. Lloyd. He is one of our most able counsel, and a fluent and a ready orator, as I need not remind those who heard his brilliant speech on Wednesday, the 9th of December, in this room; and further, as he has told us, he is a counsel who has a professional knowledge of patents, having frequently advised upon them. Thus, therefore, those who oppose a Patent-law cannot say that in this discussion they were left without an adequate representative; and I may take it that the very best which can be said in opposition to such laws has been said. I will now therefore reply to the observations of Mr. Lloyd as representing the embodiment of the opposition to the principle of protection. Mr. Lloyd complained that my paper was one-sided, and that, while I had given my views of the case, I had not put forward those of the opponents—that, in truth, mine was an advocate's paper. Now let us see what the facts are, and whether Mr. Lloyd was justified in those remarks. I started in my paper by pointing out that the opponents of a Patent-law allege there were four incentives that would suffice to cause invention to flourish in the absence of any Patent-law; and, after having endeavoured to refute them, I went on to state that, even assuming my contention were right and that these incentives were not adequate, still there were persons who said the evils attendant upon a Patent-law were so great that any harm which might happen to us from its abrogation would be less than that which would arise from its preservation. The alleged evils I told you were seven. Now I will ask whether I have failed to state fully my opponents' case. If I had omitted any thing, would not that omission have been at once specifically pointed out? But has any thing of the kind been done? has anybody instanced a fifth incentive, or put forward an eighth evil? Has Mr. Lloyd suggested either the one or the other? If he has not, where is the ground for his complaint that I do not state the opponents' side? I have stated not only all that I could think of, but, as it turns out, all that he could think of; for he has not been able to bring forward a single addition either to the incentives or to the evils. Supposing I had raked up some other incentive or other sin, would not Mr. Lloyd have been the first to accuse me of "setting up giants to knock them down?" And would he not have said that no one ever suggested either such an idle inducement or so paltry a grievance? And in effect Mr. Lloyd has said this; for, so far from adding to the number of either the sins or of the incentives pointed out by me, he discards one of the sins; and, to my great surprise, that which he discards is the sin of all others which, in the eyes of Mr. Macfie and his supporters, renders the Patent-law intolerable. Mr. Lloyd says he does not allege that the Patent-law operates as a limitation of free trade, properly so called. I could hardly believe I heard correctly when Mr. Lloyd made this remark. I agree with him, of course. I have said, and I have endeavoured to prove by illustration and by argument, that a Patent-law is no more an interference with free trade in any reasonable understanding of that phrase than is the possession of any other property, and that one must go to a communist rendering of free trade for a justification of the expression that a Patent-law interferes with it. But take Mr. Macfie's book on the abolition of patents, and look in the index, and you will find there "Trade interfered with by Patents," and a reference to some half-dozen pages where this point is urged. However, if there are to be future discussions on this question, the opponents of the Patent-law will have to explain away as best they may the admission of their champion in this discussion, that patents do not interfere with free trade. To my great surprise, a shrewd, practical man like Mr. Lloyd, well versed in the ways of the world, says he thinks the suggestion that invention is promoted by the expectation of reaping the reward to be derived from patents, places invention upon a low platform; and he seriously put forward honour as a sufficient incentive to invention, and to invention carried to a practical result. He did this so well, and so eloquently, that I could see a feeling of indignation at my sordid spirit arising on the countenances of many of his hearers. However, I am glad to see I do not stand alone in believing that the incentive of honour is insufficient. The 'Times,' in a leading article which appeared on this subject on Wednesday, the 9th, says—"As to the plea that those whom the Patent-laws now attract may be adequately rewarded by merely honorary distinctions, it is perhaps due to the seriousness with which it is offered to refrain from regarding it as ironical;" and I must say that, if Mr. Lloyd had not in this discussion shown, happily for me, that there were those who believed in such a reward, I should have felt I well deserved the implied rebuke of the 'Times.'

But Mr. Lloyd, as in duty bound, having made the suggestion, endeavours to defend the adequacy of the incentive. He says there are great men who have given to the world the benefit of their discoveries who took out no patents—large-minded men who thought only of the good they were doing and of the honour to be derived therefrom. Mr. Lloyd made this statement; but did he tell us who these men were? Did he give us one single instance? I will venture to say not one, unless, indeed, it were Ronalds, the first suggester of the electric telegraph. Mr. Lloyd did not tell you that Ronalds, who took out no patent, confined his invention to the making of a telegraph in the garden of his own house, and that having done this so long back as 1816, he left the invention in that stage, and brought it no further forward than the condition of a scientific curiosity. So electric telegraphs remained dormant and useless, at least to the world, until Wheatstone and Cooke invented practical apparatus, acquired property in that invention by a patent, and then, it being worth while, vigorously pursued the matter, and the telegraph, which, as I have said, had lain dormant for so many years as a mere scientific idea, became an actual working fact. What do the public want? more Ronaldses or more Wheatstones? On reflection I am not quite sure whether Mr. Lloyd did not intend to include the Stephensons among those who worked only for honour. He brought their names forward at this part of his argument, and it is possible he did intend to include them. Most certainly I am not going to deny that these men were large benefactors, not only to their country but to the human race, neither am I going to deny that they obtained honour; but I will ask did they not obtain the very substantial rewards which I am urging are necessary as an incentive to exertion? and, moreover, were not the Stephensons patentees? I shall have to refer you, in the course of the evening, to a patent granted to Robert Stephenson. I do not know whether I am right in supposing that Mr. Lloyd had the Stephensons in his mind; but if he had not, then, as I have said before, not one solitary instance did he give us of the great benefactors who worked for honour. He asked, in impassioned terms, would not one's heart glow in passing by a statue that had been erected in commemoration of the great inventions of some disinterested discoverer? I will go entirely with him here; I will go even further, and I will say that if I were the son of a meritorious inventor, whose sole reward had been a posthumous statue, my heart not only would glow, but would burn—not with joy at the honour to be derived from the statue, but with indignation at the wretched laws of a country which could secure to an inventor no better reward. Mr. Imray most cleverly summed up the whole matter by saying, " The inventor asked for bread, and you give him a stone." I was gratified to see Colonel Strange, and many other gentlemen of position, stand forth and say boldly and fearlessly that in perfecting their inventions, although they were not indifferent to the good these were to do, the strong immediate support of their labour was the hope of gain.

Mr. Lloyd next objects to the cases I have chosen, which I have called typical cases, in support of my views. He says they are cleverly picked out, and that they are not fair, and he compliments me upon my skill in selecting them and in putting the drawing of the Siemens furnace upon the wall; but although he is of this opinion as regards the bulk of my typical cases, he states I have brought forward one that, if any thing were wanted to show the reckless manner in which patents are granted, gives the strongest evidence that could be brought to prove it. The case of the fish-joint *. I will ask you to bear with me at a little length upon this question of the fish-joint. Some of my observations upon it belong equally to another portion of my reply, that portion in which I hope to say a few words upon the amendment of the law; but to prevent repetition I will, so far as the fish-joint is concerned, state all that I have to say about it here. On the wall I have hung drawings relating to this subject. One figure shows you the fish as known long before the days of railways. You may find it described in Tredgold's 'Carpentry,' the second edition of which was published as long since as 1828, and I have no doubt the fish is to be found in earlier works than this. Fishing, as I have depicted it, consists in placing end to end the two pieces of timber which it is desired to unite, and in putting on the opposite side of these pieces (and extending some considerable distance above and below the joint) two other pieces, which are the "fishes." Bolts are passed through the fishes and the two pieces of timber, and in this manner the joint is made. Such a joint as I have shown is one that would be employed in the vertical pumping-rods technically called "spears" in a mine or pit. The mariner's way of making a "fish" was to wind cordage round about the "fishes;" and in reading Anson's 'Voyages' and other books of sea adventure, you may come across such an expression as this, "the fore topmast was badly sprung, but we fished it." You will find a full description of the mariners' use of the "fish" in the 1815 edition of Falconer's 'Marine Dictionary,' under the title of "fish-joint." Moreover the fish, under the name of

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* Mr. Lloyd's observations do not appear to have been reported quite fully, and this particular objection (along with some others) made by Mr. Lloyd is omitted from the print of his remarks.

"splint," is used by surgeons for temporarily holding in position a broken bone, and the French engineers who have adopted the English invention of the fish-joint apply the surgical term to it and call it *joint à éclisse*. Thus it is clear, beyond the shadow of a doubt, that "fishing," as well to unite separate pieces of timber as to strengthen a cracked or sprung part, was well known, not only before the date of the fish-joint patent, but before the very introduction of railways themselves. I must not give you the history in detail of permanent way, for it would occupy you for several nights were I to do so; but I will content myself by saying that, after many trials, the form of permanent way that was in most general use prior to the fish-joint was the one shown in the drawings I have placed on the wall. In the first diagram there is a representation of portions of the two rails on each side of some joint, which rails were carried in cast-iron chairs supported on wooden sleepers, and these, in their turn, supported on the ballast. At the very joint itself there was placed a wider and heavier chair, called the "joint chair," resting upon its sleeper. A wedge was driven in between the jaws of the chair and the side of the rail, and the chair itself was spiked down to the sleeper, and in this manner the permanent way was laid. Now assume that the wheel of a locomotive or of a carriage was coming along, say from right to left, when it got into the neighbourhood of the joint it would seek to bend down the right-hand rail upon which it was, and the rail, being all on one side of the centre line of the chair and sleeper, would tend to cause the right-hand side (that side of the sleeper supporting the rail) to be depressed, while the other side would be correspondingly elevated; the result would be to cant the sleeper, and to raise the left rail on to which the wheel next had to pass. The transferring of the weight of the loaded wheel from the right-hand side of the joint to the left would obviously have the effect of reversing the cant of the sleeper, and of causing the left-hand side to go down and the right-hand to come up; and thus for every one of the numerous wheels in a train which pass over the joint there would be a rocking of the sleeper. The first result of such a rocking was the loosening of the key, thus affording greater freedom for the movement to take place; and the next result was the triturating of the gravel beneath the bottom of the sleeper, so that in wet weather the ballast speedily became reduced to a muddy mass, and the road was out of order until the sleeper was repacked. This disturbance of the road was a great source of expense; moreover the wheels were injured by the blows, and travelling was rendered most unpleasant. I dare say very many in this room no longer remember the noise caused by passing over an unfished road. It is almost impossible now to find any such roads in England;

but on the Continent some still remain, and the travelling upon them is most disagreeable. Moreover, as I need not say, such a condition of the road was scarcely safe, even for the light engines and slow and infrequent traffic of former days. But, with the common joints in use before the date of the fish, it would be absolutely impossible to work railways having their present amount and style of traffic. You will see that the joint sleeper was constantly getting out of level, and, what was more, that the end of the rail was raised and presented to the wheel, causing it to be put in danger of being thrown off the line. But there was a further source of injury and a further danger arising from the use of a joint chair, and this was that the end of the rail was extended laterally; and I may tell you the cause of this. Supposing that you were set, as a task, the reducing of a two-inch bar of iron to a thickness of one inch, and that you might do it in any part of the length of the bar which you preferred. Your very instinct would tell you to attack one of the ends of the bar, and not to apply your efforts to the body part; and your instinct would guide you correctly, because in making a depression from two inches to one inch, accompanied of course by a corresponding widening of the bar if you made it in the body of the bar, you would have to disturb not only the mass immediately below the hammer but the mass on each side of this first mass, which latter masses unite the first with the other parts of the bar; while if you take the end of the bar, you only have to disturb the similar mass on one side of your operations, the other side having no connexion with any other metal, and thus it is that the end of any bar, or of any rail, is the most vulnerable part. Now with the old joint chair the end of the rail rested on the bottom of the chair, which acted as an anvil. Moreover, as I have told you, the ends were raised and lowered at the passage of each wheel, and thus a blow was struck; there was in the bed of the chair an adequate resistance to receive that blow, and in this manner the ends of the rails were spread out into a fan shape, as I have sketched them. Now if a new rail, which was not so spread out, were laid into a joint chair in juxtaposition to an old rail that was, there was presented to the advancing wheel a lateral projection likely to be struck by it. The foregoing were the express admitted defects in the joints of rails, and they had existed for more than a quarter of a century. Many attempts have been made to cure these defects. A figure on the drawing shows one of these. In this instance the ends of the rails were what is technically termed "scarphed" (a carpenter's term), and it was hoped that by bringing the ends of each rail beyond the centre line of the chair, the rocking of the sleeper would be prevented. But I have already told you the end of the rail is the most vulnerable part, and you will see that this scheme possessed the disadvantage of halving the end of the rail and making it still more easy to attack; this plan did not answer. No less a man than Robert Stephenson set himself to remedy the evils arising from imperfect joints. The chair which Stephenson patented, you will see by the drawing, was made with the interior of the bottom of the chair segmental; in which was placed a sort of rocking bed-piece, on which the ends of the rails lay, Stephenson's hope being that the movement might take place between this rocking bed-piece and the chair itself, and might not extend to rock the sleeper in the ballast. This plan failed. Another device used to some considerable extent in the United States, the rails for which were manufactured in England, consisted in splitting the rails longitudinally for the whole of their length, and placing the joints of one half (say the right half) midway between the joints of the left-hand half, or, to use a bricklayer's phrase, "breaking joint." This scheme had to be given up, for it involved making that which might, looking at the weight of metal, have been one strong rail into two weak ones, which failed. Now this being the condition of things prior to the date of the fish patent, and "fishing" itself being as old as any thing probably well could be, let us see what the fish patent was. In the ordinary section of rail the joint chair is wholly done away with, and the joint is over a void. This, perhaps, may not now strike you, who observe this construction every day of your lives upon railways, as any thing extraordinary; but I can tell you that the idea of putting a joint over a void was most repugnant to the engineering mind, which said, "What! leave the very end of the rail, the joint, unsupported? The suggestion is sheer madness; anybody must know that of all the parts you ought to support, the rail end is the one;" and so everybody thought for twenty-five years, and so some persons unhappily think to the present day, for they absolutely combine a joint chair with a fish. But what are the facts? We know that the end of the rail is the most vulnerable part, and that, with the old joint, it yielded so as to spread out sideways; it did so because it had the chair taking the place of an anvil below it, and in this way the blows that were given to it by the advancing wheels were effective. But once put the rail end off the anvil, and over a void, and the blows become harmless. The consequence is, that by the introduction of this mode of jointing with a suspended fish-joint, the ends of the rails are preserved from the damage under which they formerly suffered; moreover, there is no joint sleeper to be rocked, and that great source of derangement to permanent way is got rid of. Leaving on one side the comfort to the traveller, I am not exaggerating when I say that the superiority of the fish-joint, as compared with any joint in previous use, has a money value in this kingdom alone (in the greater endurance of rails, wheels, and permanent way, and in the power to carry heavier and quicker traffic) that must be measured by hundreds of thousands per annum, if not by millions; and yet this is the invention for which Mr. Lloyd says a patent never ought to have been granted. I have already commented on the assertion made by the opponents of patents, that really in nine cases out of every ten there is no invention; but as soon as a necessity arises, the means of satisfying that necessity will occur to any dozen men of ordinary ability. But is not this fish-joint instance a strong proof to the contrary; here, according to the opponents, there is no invention at all. They say the fish existed already, everybody knew it; and yet I have shown you nobody improved the joints of rails by its use. It cannot be urged this was because no one was devoting his mind to the question of rail-joints. Many men were doing so. I have given you three instances of the way in which they endeavoured to cure the evil; not one of them succeeded. The fish was there to their hands, but no one applied it to rail-joints until there came William Bridges Adams, a carriage-builder, not a civil engineer; and the carriage-builder did apply it, and he told the engineers that they were wrong to support the joint, and that the joint ought to be over a void; and what happened then? The engineers did not believe it, and they said it was all nonsense; they disputed the carriage-builder's opinion, and it was not until a civil engineer, who is now dead, became interested in the patent, and devoted himself to getting the thing at work upon the railways, that the joint came into use; at present its adoption is all but universal. Now with whom do you agree—with Mr. Lloyd or with myself? Was this a case for a patent, or was it really one of those idle things which any man could have done?

As I have said, Mr. Lloyd's conversion does not appear to be by any means complete. He seems to entertain very curious opinions as to the kind of inventions for which patents should be granted—in fact, opinions so curious that they appear to amount to a prohibition of patent grants at all. In the first place, if I follow his arguments correctly, he would never give any patent for an improvement, and in the second place he never would give one for an original invention which may be afterwards superseded by an improvement; but when he has excluded these two classes of invention I don't see what remains. He challenged me to say who invented the electric telegraph and who invented steam propulsion, implying that the persons who had got patents for those matters had got them wrongfully, because the patents ought to have gone to the undiscoverable original inventor. With respect to the electric telegraph, I have already told you what happened in the case of Ronalds, who had no patent; he failed to bring the telegraph into the practical form which was useful to the public. Wheatstone and Cooke did bring it into that form. But, as I understand Mr. Lloyd in his view, if any one should have had the patent at all it would not be Wheatstone, but Ronalds. But the next phase of Mr. Lloyd's argument would have forbidden the patent to Ronalds. What did Mr. Lloyd say about Dr. Siemens's Regenerative Furnace when considering that as a patent invention? Why he said that, clever as it was, it was a thing that was about to be superseded by something better, and implied, as I understood him, that therefore it was not worthy of the patent protection which it had enjoyed. I do not agree with Mr. Lloyd that it is going to be superseded; I believe there is ample room in the world both for it and for the extremely ingenious and meritorious invention to which Mr. Lloyd alluded as likely to supersede it. But why, if it were true it was about to be superseded, should not the inventor of such a furnace have reaped some of the benefit which during many years it has bestowed upon all sorts of industries and during which years the alleged superior invention had no existence? I may tell Mr. Lloyd that in conversation with the inventor of this second furnace only last Tuesday week, when we were considering this question of the Patent-law, the inventor said to me "Do you think that I should have devoted six years of my time and very many thousands of pounds to perfecting my invention if I had not had the protection of a patent;" and on Wednesday last that gentleman (Mr. Crampton) came here and repeated the statement before the meeting. In the same way with respect to the invention of Dr. Potts (that Mr. Lloyd thought had never been practically employed, in which, however, he was mistaken, as almost every engineer knows); according to Mr. Lloyd, Dr. Potts ought not to have a patent because his plan has been superseded. I am really at a loss to see to whom Mr. Lloyd would give a patent. Not to the inventor, because at some future time his plan may be superseded. Not to the improver, because he is only the improver and not the first inventor.

There is another proof of the very bad way in which the converter of Mr. Lloyd has done his work. Mr. Lloyd told us a man may reward himself by becoming the maker of his own invention; and he says if Crompton had not thought so why didn't he take out a patent for his mule? I will tell Mr. Lloyd why Crompton did not take out a patent. In the year 1780, when Crompton invented his spinning-mule, he was but a young man, living in the then small market-town of Bolton, and working as a journeyman weaver. We are asked why a man in that situation did not journey to London, which probably he must have done on foot, and at the end of his journey find £300 to pay the then cost of a patent for the United Kingdom. Was it not more natural for Crompton, being in such a position of life, and having his limited knowledge of the world, to endeavour to protect himself by a secret manufacture? and I need not tell Mr. Lloyd, as a lawyer, that when Crompton had once sold the produce of his manufacture, although that produce might have been made in secret, his patent if subsequently taken out would have been in great peril. Mr. Lloyd admits that secret manufacture is demoralizing; but it is not every opponent who does so. Since I wrote my paper I have read Mr. Macfie's book, and I find that I am supported by that book in one of my objections to secret manufacture—namely, that the workmen would be tempted away. What says Mr. Macfie (at pages 62 and 63)? "That the patent system has an effect on wages, which demands a serious consideration of the friends of working men. I believe it helps to keep wages low. The abolition would work in this manner—whenever in any establishment an improvement is introduced, the fact of its use becomes of course speedily known throughout the establishment and in other establishments. The employés, who in their ordinary occupations must come to know what the improvement is, and how to work according to it (for this is a matter of necessity, especially now that the operations are conducted on a large scale with the indispensable aid of men intelligent and independent), very soon find they are in request. To prevent their leaving, they are offered an advance, which itself, in its turn, may be outbid." I am glad that in this respect Mr. Lloyd does not agree with Mr. Macfie, and that he does not consider this a desirable state of things. Mr. Lloyd says that in my ingenuity I have imagined inventors of a most unlikely character as the producers of substantive inventions, and that I have done so in order to show how difficult it would be for such men to become prosperous manufacturers. He accuses me of having created a "a fanciful country parson" for the illustration of my argument. It is true I state the case of a parson, but I do not do so in general terms; I identify him as Cartwright, the inventor of the power-loom. Is that a creation of fancy? I will give another instance of a parson—Bell, the inventor of the reaping-machine; he was a Scotch minister.

I will now say a few words about the incentive to invention to be created by national reward, because to my mind any one (except Mr. Macfie) who once admits that some reward is to be given to the inventor, over and above that which he may obtain from manufacture, will eventually find himself driven to admit the expediency of a Patent-law. Mr. Lloyd, I believe, says that he would give some reward, but does not see how to do it, except by the grant of a patent. Lord Derby (see Mr. Macfie's book), although he would not grant a patent, still thinks that some reward should be given, but confesses that he cannot tell how to carry it out. Sir William Armstrong (see the same work) says he believes rewards should be given, but he is not prepared to state by what means the giving of rewards could be carried into execution; and I am convinced, as I have said in my paper, that any such scheme must break down in practice: and it is on this ground I venture to predict that those who admit reward necessary, will find themselves compelled to preserve a patentright, except in one instance; I must always except Mr. Macfie. He sees no difficulty. Those obstacles which were too much to be solved by the minds of Lord Derby, of Sir William Armstrong, or of Mr. Lloyd, have no terrors for Mr. Macfie. Read from page 84 to page 88 of his book, and you will find the whole thing cut and dried. There is to be £200,000 per annum set apart for the purpose of the rewards and of the attendant expenses. He calculated that £125,000 will suffice for the rewards: there is to be in each year one great prize of £10,000; and then the value of each prize dwindles down, and their number increases until one gets to a class where there are as many as 400 prizes, but only of £50 each; and after this we come to "honour" medals and certificates. These prizes, including the honour (which I am surprised to see Mr. Macfie put last, as being of less value than £50, while he gives the front rank to the £10,000), are, however, only to be awarded after the invention has been tried and proved practically successful, which, according to my view, might be any time or never, as it would be nobody's interest to take it up. Moreover the prize is not to be without cost or trouble, because by clause 11, where there are rival claimants, the question of deciding priority in respect of time and merit is to be borne by the disputants. I should think that the balance out of the £50 reward would, under such circumstances, be rather small.

Mr. Lloyd has accused me of assuming a lofty air in this matter; but at the risk of a repetition of the accusation on some other occasion, for it cannot be made to-night, I must again say, that any person who puts forward such a proposition as this which Mr. Macfie has advanced is fairly open to the charge of not having made himself master of his subject. One prize of £10,000! What does he suppose Bessemer spent before he made a ton of metal that was commercially valuable? What does he suppose Dr. Siemens spent before his furnace was in practice? Why such an amount as £10,000, so far from being an adequate reward, would not pay the expenses of developing a large invention. And remember that it is only when the invention is developed Mr. Macfie would give his prize (apparently he sees the difficulty of awarding for inventions that are untried); and he would ask you to believe that a Bessemer or a Siemens would go to work, spend his thousands and his valuable time to perfect an invention which, when finished, would be open to the whole world, and would do all this to stand the chance of getting a sum that would not cover his expenses.

With respect to patent litigation, quoting from the appendix to the report of the committee of 1871, I told you that the average of cases which had reached a primary decision in patent matters was only 8½ per annum. Since the paper was read a friend of mine, a solicitor, has caused the 'Times' to be searched from the 1st of November 1873 to the 31st of October in this year, and he finds that during that twelve months there are nine patent cases reported. Now, as I have said, that is an extremely small amount of litigation, looking at the enormous interests involved. But still that litigation, small as it is, is necessarily the part of the patent question which is most strongly before the legal mind. In the patent system, as in other matters, lawyers see humanity at its worst. All the dispute, trouble, and litigation they see; the large majority of instances in which things go on quietly and smoothly they do not see; necessarily they are induced to take a gloomy view of the working of society. During the twelve months in which there have been the nine patent cases, how many actions have there been, does one suppose, on bills of exchange or against railway companies? The number of such cases has doubtless been very large; but persons know that bills of exchange and railway companies must continue. Nobody ever suggests that they should be got rid of; and yet, as the very principle of patents has been for many years in dispute, those to whose attention patent actions have been brought do not look upon them in the manner in which they would look upon actions in other matters, as being part of the prices to be paid for a great benefit, but as something which proves the whole system to be so radically wrong that it should be swept away.

If this line of reasoning were to be followed, what is there that might not be swept away? My friend the solicitor must have had some curious speculations in his mind as to how far such sweeping measures might extend; for he told his clerk to extract from the same folio of the 'Times' the number of reported actions for breach of promise of marriage; these amounted to forty-four, while the patent cases, as I have said, reached only to nine. Looking at the fact that the lawyer, of necessity, sees humanity at its worst, I am very glad indeed to find that men of high position at the bar, like Mr. Fitzjames Stephen, Mr. Hinde Palmer, Mr. Aston, and Mr. Webster, come here and advocate the continuance of patents, because if a man who sees a thing at its worst still believes it is worth continuing, I have every right to claim his evidence in my favour, while it would not be at all unfair for me, if he were an opponent (as I am afraid my friend Mr. Lloyd still is in his secret heart), to say, "I don't value your opinion in opposition as much as I should do that of a man who saw the bright side of the question as well as the dark one." Not only do lawyers see the dark side of the patent question, but that dark side is particularly repugnant to them There are a sufficient number of shipping cases, of railway cases, and of a variety of other cases to enable men of eminence at the Bar to make some one class a speciality; and you find barristers who are at the front of their profession celebrated for their command of some particular branch of practice, but the very paucity of the patent litigation prevents there being more than one or two leaders who have a reputation for patent business. The juniors who advise on specifications and matters of that kind do find constant employment, but in the instance of a leader this is not so; and as in every instance litigants naturally wish their cause to be advocated by some celebrated man, they are compelled generally to select as their leader one to whom a patent action is an unusual event, and who therefore approaches it with the same sort of difficulty with which a barrister who is principally familiar with disputes relating to shipping would approach the grappling with a case upon Ritualism to be heard before the Privy Council. I do not for one moment mean to say that the leader who is taken out of his usual line of business cannot deal with a patent action, but I say that he does not like it. I believe, however, that my comparison of the shipping case and the Ritualistic case is not even strong enough to apply to the patent question. The shipping and the Ritualistic case may be both learnt from books; and without for one moment undervaluing the importance of either class of case, there is nothing but argument involved in them, such arguments as a highly trained mind delights in. There is very little sheer drudgery; but with patent actions this not so, for in them the barrister is called upon to make himself familiar with the details of some machine or of some process. Now I know many men of very great ability, who are capable of expressing an opinion of the highest value on matters political, social, and even artistic, who, when you ask them to investigate the construction of a machine in order that they may appreciate its merits, appear to be absolutely help-less, and who give way to despair when brought face to face with mechanical intricacies. It may be that the next generation, who will have profited by the more scientific training that is now being given at our universities, will not find themselves in so great a difficulty; but the men of the present day, educated thirty or forty years ago at Eton and at Oxford, notwithstanding their acquaintance with classical literature, and it may be even with mathematics, had rarely any training in physical science, and had none in science as applied to manufacture; and to most such men the very documents that we mechanical engineers use to express our meaning one to another—namely, diagrams drawn in geometrical elevation—are absolutely unintelligible. The untrained eye abhors a geometrical drawing, and requires perspective; while the trained man rejects the perspective as wholly useless, because he cannot gather dimensions from it.

It is true that any member of the Bar, or any country gentleman, recognizes an architect's geometrical elevation of a mansion; but he does so because he is constantly seeing houses and mansions, and very frequently, so far as the houses in a street are concerned, he gets only a front view, and there is nothing in it very suggestive of perspective. Moreover the architect takes care to put some colour on his drawing; and the blue tint of the glass in the windows, the red of the brickwork, the yellow of the stone, and the smoke out of the chimney-pots all proclaim, even in the absence of perspective, "this is a house." But give nine out of ten men unacquainted with mechanics a drawing, not of the familiar house, but of some entirely unknown machine—a drawing, moreover, from which colour and shading as well as perspective are absent, and the probability is that they will frequently confound the spaces between levers for the levers themselves, and that the whole thing will be to them a puzzle as great as Egyptian hieroglyphics would be to mechanics. One can well understand how it is that a man in high position, accustomed to grasp with facility the most complex problems in social life and in law, is annoyed at finding himself met on the very threshold of a patent-case with difficulties of the nature I have described. I will ask you to let me give you one case in point. The late Sir John Rolt, when he was at the Bar, had to lead in a patent-case about a spinning-mule; and it fell to my lot to endeavour to explain, not by drawings, for that was hopeless, but by the most expensive models, the spinning-mule about which he had to address the Court. I happened to reach the room where the model was before Sir John Rolt arrived; and when he opened the door and saw the model (which was rather a large one), and before he saw that any one was in the room, he uttered, in the most dismal manner, these words, "Good Lord! how am I to understand all this?" Sir John was a most patient pupil, and many and many a weary hour did he devote with me to the understanding of this machine; and on the morning when he was going into court he said, "If after all your care I fail in describing this, as I certainly shall, don't laugh at me, but think what your position would be if you had to go and argue a question of contingent remainder."

Now here you have an instance of a man among the very highest in his profession, of a most acute mind, who had honestly and laboriously endeavoured, in the interest of his client, to impress upon that mind matters which to a mechanical engineer were as well known as the rudiments of the law were to the counsel, who even at the last moment doubted how far he had succeeded in his endeavours to master a subject which he had to explain to a judge, and, if the action had been at common law, to a jury also; and this judge, labouring under a similar inaptitude to that under which the counsel labours, has to gather the gist of the invention from a man who is not even sure from one moment to another whether he can remember the lesson he has so painfully learned. Is it to be wondered at that under these circumstances patent-cases are viewed with dislike by the judges as well as by the Bar, and that although these cases, as you have seen, only amount to nine (carried to a primary decision) in one year, they create a feeling of dislike? and is it strange that this feeling should, all unknowingly, bias the opinion of such men as I have mentioned and make them adverse from patents as a whole? I shall have to revert to this point when considering the improvement of the law.

Mr. Lloyd and Mr. Samuelson both appeared to think I regard too lightly the case of Holland and of Switzerland; and Mr. Lloyd complains of me for quoting Lord Houghton's summary mode of disposing of Swiss pretentions to originality. I am told that in Switzerland there are meritorious manufactures; I was already aware of it, but that does not affect my position. My argument is that the extinction of a Patent-law would check invention in the country in which that extinction had taken place; and although I am told there are meritorious manufactures in Switzerland, I have not been told that there is invention, nor has any one said that there was any invention in Holland; but Mr. Samuelson suggests the sugar-refiner in Holland might manufacture unburdened with patent dues, and thus compete successfully with the sugar-refiner in England. It may be that isolated cases of this kind can be found; but the true question is, what is the balance of advantage? because that is really the thing to look to. Further, let me point out this to you, that small States can behave in a manner which may be for their own immediate advantage and for the disadvantage of their neighbours, while such conduct could not be pursued by more important countries.

Let me give you an illustration. Suppose twenty men live in a London square, and they have separately paid each say £10 a-year to keep up the central inclosure of trees and flowers. A house becomes vacant, and falls into the hands of a churl, who examines his lease and finds that, by some curious oversight, although powers are conferred upon him of entering the inclosure at all times, no obligation is cast upon him to contribute to keep it up. Such a man as that may, if he is not prevented by shame, refuse to pay his subscription; the other nineteen householders would say, "You are a shabby fellow; but we are not going to deprive ourselves of the enjoyments of the garden because you fail to pay your share. We must put up with your conduct." The garden would still be kept up, and this man would reap his paltry advantage. But suppose ten houses out of the twenty were let in a lump to a churl, who had the power of refusing that either he or his tenants should subscribe to the maintenance of the garden. What would happen then? Would the other ten keep it up? I think we may be quite sure they would not; and the whole thing would go to wreck, to the loss of the churl as well as of the ten men who were willing to bear their share. And so it is with the Patent-law. A State like Holland, with its two millions of inhabitants, may abrogate the law, and inventors will still go on inventing for the benefit of such countries as England, the United States, and France; but let one of these countries be unwise enough to forego protection for invention, in such a case I undertake to say that invention would receive a shock which would arrest its development. Mr. Samuelson put forward supposititious instances in which an English manufacturer might be at a disadvantage with one living in a country where there is no Patent-law; but did not Mr. Aston give, not a supposititious but an actual instance of a most striking kind, where he conclusively showed that it was due to a Patent-law, and to a Patent-law only, that an English manufacturer was enabled to hold his own against his Swiss rival? After Mr. Aston's reply, there is no need for me to pursue the subject; but I cannot refrain from asking whether, if the question were thoroughly investigated, it would not be found that the false notions of political economy which prevail with so many of our workmen were the cause of the burden under which our manufacturers labour, and not the fact of their having to compete with a small country which had not a Patent-law. I am not alluding to the combinations among workmen to increase wages, which appear to me to be perfectly justifiable; but I am alluding to those combinations which have for their object to decrease the work done, and to put artisans on an equality one with another, not by raising the sluggard and the unskilful man to a level of production bordering upon that of the industrious and the dexterous, but by bringing these latter down to the level of the former. Mr. Samuelson told you I ought to have said that the Patent-law of Germany was a law only in name. I thought that I had done so—not, indeed, by classing Germany among those countries which have no Patent-law, for that would not have been correct; but I told you that the law was so bad that one effect of it had been to drive Dr. Siemens away from his own country, where he could get no protection for his inventions, and to bring him to reside among us. England, at all events, in this instance, has nothing to complain of. The Queen has obtained an illustrious subject, while English engineers and men of science of this country rejoice in the accession to their ranks of one who commands not only their esteem but their warmest affection. Although, perhaps, it might come more properly in that part of my reply where I speak upon the amendment of the law, I think, on the whole, it will be better to give you here an instance of the folly (for I can use no other word) of those who in Germany have the conduct of the Patent-law. I explained to you the other night the nature of Dr. Siemens's Regenerative Furnace, of which a drawing hangs upon the wall; and you remember I told you the way in which he trapped the outgoing heat and stored it up to be utilized again, was by passing it through a mass of cellular brickwork, which, having both a great specific heat and also the power of resisting high temperatures, is eminently qualified for the purpose Dr. Siemens had in view. The Examiners in Prussia refused Dr. Siemens a patent for his Regenerative Furnace on the score of want of novelty; and they were good enough to give the way in which this furnace had been anticipated. They refused Dr. Siemens's patent for his Regenerative Furnace on the ground that in the houses of the knights who returned from the Crusades, ovens were to be found lined with stones, which first absorbed heat from a fire and then gave out that heat to whatever had to be cooked; and thus, according to their view, had Dr. Siemens's Regenerative Furnace been anticipated.

I will now say a few words upon the other branch of the subject which has been discussed—the amendment of the law, or rather, as Mr. Samuelson tells us, the amendment of the way in which the existing law is carried out. I will ask you to refer to an article in the papers for Sessions 1865 and 1866 of the National Association for the Promotion of Social Science, beginning at page 245 of the volume for those years, headed, "Report of the Sub-Committee on the Patent-laws." Of this Committee I was, as I have said, by no means an idle member, and the results of our deliberations are to be found in that report. I will state to you, with the greatest possible brevity, some of the leading recommendations; and I think, when you hear them, you will agree that nearly every thing which has since been demanded or suggested is embodied in the recommendations of that committee. With respect to the granting of patents, this was only to be done after an examination for novelty and not for utility; and I shall have to say a few words upon that point before I close. If the opinion of the examining officer were adverse to the novelty of the invention, the applicant, nevertheless, if he insisted, was to have his patent, but subject to the following conditions:—that the adverse report should be recorded and printed with the specification; that in any proceedings, either for or against the patent, the patentee should give security for costs; and that in the case of his being defeated in an action upon the ground stated in the adverse report, he should pay every shilling of his opponent's costs as between attorney and client. We also gave an appeal from the examining officer. We then made certain provisions about disclaimer. Next we considered the point which, in my judgment (and I am glad to find it is confirmed by the observations of Mr. Aston and of Mr. Imray), is the most important of all the points in which improvement may be made: I mean the securing a clear, definite, intelligible specification, a specification which shall be not only a guide, but a warning. You will find that, according to our regulation, the patentee was to be called upon to make the final specification clear and intelligible; and on his failing to do so, the adverse opinion of the Examiner was to be printed with the specification. With such provisions did we hedge round the granting of a patent. But you will see that we did not propose any examination as to utility. This question was the subject of discussion during many of our meetings. But we came, at last, to the unanimous conclusion that any such examination was likely to produce more harm than good; and it is upon that I shall shortly address you. The examination for novelty, when pursued in a sensible and proper spirit, is one which may perhaps (for I am compelled to speak doubtingly) be safely intrusted to competent men; but the question of utility is a far wider and more difficult one.

I gave you an instance of this in the case of Dr. Potts, when in my paper I supposed a Board of Examiners at work to ascertain to what untried invention shares in the national reward should be given; and I suggested that such men would be very likely in the case of Dr. Potts to deem his invention altogether impracticable, because they would say his proposition of sinking a hollow pile by exhausting the air from it was an absurd one, as it was only a roundabout way of putting upon the head of the pile the slight load equal to the pressure of the atmosphere. But these men, as I told you, would have been wrong; and yet, in the case of an examination as to utility, such a patent might readily have been refused by very able men too confident in their own opinion. Suppose, however, the Examiners had been right and Dr. Potts wrong. What would have been the harm to the public in granting him his patent for this useless thing? I will repeat the truism to which I gave utterance in my paper, that if a thing be useless, nobody wants to use it; it stands in nobody's way, and the only harm done is the loss of the time and money of the inventor. But don't let us, for the sake of protecting one inventor against himself by the exaggerated Paternal Government style of treatment, cause the public to lose the benefit of an invention being brought into practical use, which that inventor feels to be a sound one, although he may not be able to explain the grounds upon which his invention would act; for, with all due deference to Mr. Lloyd's law, I believe there is no obligation on an inventor to explain the principles of action, all he is bound to do is to describe how to carry out his invention. Further, on this question of examination, I have very great fear of it even in respect to novelty; and to show the danger attendant upon examination, as well for novelty as for utility, I will take one of the highest cases I can think of—the case of James Watt. I believe that a large number of educated men in England, not engineers, are under the impression that James Watt was the inventor of the steam-engine, and many, who know better, still think that before his time no powerful mind had been directed to the subject. But this was not so. Newcomen had brought the steam-engine to the condition of an automatic machine that could be depended on for exerting great force in pumping, and Smeaton had devoted himself to perfecting Newcomen's engine. The readers of Smeaton's works and of the Transactions of the Royal Society well know that Smeaton possessed one of the most powerful minds we have ever had in England, and that his celebrated engine at the Chasewater mine was a triumph of mechanical skill. Now let us see of what that engine consisted; and to aid us in this, be good enough while following me to look at the rough drawings I have placed on the wall.

Before the time of Watt we had the boiler generating steam, we had the cylinder, with the piston in it, moved up partly by the steam at a feeble pressure, but principally by the counterweight of the pump-work in the mine: the piston having completed its stroke, the steam was shut off by self-acting machinery, and no longer by the act of the attendant. We had similar machinery effecting the injection of water into the cylinder; the steam was condensed in the cylinder, a partial vacuum was made, the atmospheric pressure forced down the piston, which depressed its end of the beam, and in doing so raised the other end with the pump-rods attached and pumped the water. Now that was the condition in which Watt found the steam-engine. Let us see what it was that he did. He simply added a separate vessel called the "condenser," which, when the piston had got to the top of its stroke, was put into connexion with the underside of the cylinder. The injection of water was then made into this separate vessel, and not into the cylinder itself. The vacuum was created, the piston descended; steam was readmitted, the piston ascended, and an ordinary pump drew out of the condenser the condensed steam and condensing water which had accumulated in it from the previous operation, so that the condenser was ready to receive another cylinder full of steam. Now this invention immediately reduced the consumption of fuel by one half; but imagine James Watt going before examiners for his patent! It is difficult for us to believe now, with the reverence that we all have for Watt's name (the public at large because they believe him to be the inventor of the steam-engine; the engineer because he knows the value of Watt's improvement), that his patent would have been refused. But is it so sure that it would not have been, both on the ground of want of novelty and on that of inutility? On the score of novelty, they would have said, "Why you have the boiler, the cylinder, the piston, the valves for admission and outlet precisely as they were before. You use a pump for pumping out the water of condensation, but the pump is but an ordinary pump. The task of Smeaton's engine was to work a pump, and, moreover, he had in his engine a special pump to raise water to the injection-tank. You use injection of water to condense your steam; what is there that is new in this engine o yours except a trumpery suggestion that, instead of doing the whole operation in a single vessel, the cylinder, you will complicate the engine, to give a gloss of invention, by the introduction of a supplementary vessel?" I really do not think I am exaggerating in saying that this would have been the comment of intelligent men in Watt's days if they had had the power of determining whether the invention were novel. And as to its utility, would they not have said, "Why you are doing the very same things as were done by Smeaton, and you are simply doing them, as we have told you, by two vessels instead of one. What can be the advantage in that?" Perhaps you will tell me Watt might have answered these objections by saying, "Look at the engine which I have altered; it does its work with half the coal; and is that nothing?" But recollect that he would have wanted the protection of a patent before he dare run the risk of discovery while experimenting with the engine.

I am convinced I have not overstated this case; and should it not make us pause before we determine upon instituting examinations which, in the anxiety of the Examiners to do what they conceive to be their primary duty, videlicet protecting the public against a non-useful patent, might end in withholding from a benefactor like Watt the protection that made it worth his while to develop his invention? Is there any pressing need which calls upon us to run such a risk? Suppose it had been the truth that there had been no value in condensation in a separate vessel. Well, then, the fire-engine, in its unpatented condition, would have been as good as Watt's patented engine. Nobody would have cared to have tried Watt's engine, and no one would have been impeded from making the unpatented one. I will give you another and a most instructive instance—an instance drawn from one of Watt's inventions, and directed solely against an examination for utility. I allude to the steam-jacket. All those years ago, Watt, under the direction of that which appears to have been a marvellous instinct, said that, in order to make an engine work well, the working cylinder ought to be surrounded, not merely with a non-conducting material, because that anybody might have thought of, but with a jacket containing steam, and then that outside this jacket, but not as sufficient in the absence of a jacket, a clothing of non-conducting material should be used. Such jackets were supplied by Watt; but after his time they fell into disuse, except in Cornwall, the steam-engines of which county were for so many years superior in their economic performances to those of any other part of England. The results obtained by the Cornishmen were so good that engineers were compelled to give their meed of admiration. But they all of them derided the steam-jacket, and said, "Manifestly this must be wrong. You are increasing the surface that is exposed to the cooling influence of the air, and it is this influence that does all the mischief. Thus the jacket must do harm instead of doing good." And these were not mere uneducated mechanics who said so: the most scientific writer we had on the steam-engine, Tredgold (whose work, even to the present day, is a text-book), fell into this error, and said that the jacket was simply a source of increased condensation, and was worse than useless. Would James Watt have had any chance, under an examination into the merit of a patent, of obtaining one for his steam-jacket? clearly not. Every practical engineer and every scientific man of his day, and for half a century afterwards, would have said that this was one of the delusions of an otherwise great mind; and yet Watt was right. We not only now know, thanks to a French engineer, the principle on which the benefit from a steam-jacket arises, but we know that those wonderful results of economy of fuel which have saved ocean navigation commercially, which have within the last twelve years reduced the consumption of coal from 5 lbs. per indicated horse-power per hour down to 2 lbs. or even less, cannot be attained without the use of the steam-jacket.

I trust I have given you sufficient reasons why there should on no account be an examination for utility. As I have said, it is just possible that an examination for novelty may be of service. This meeting, however, has had very strong evidence to the contrary. Mr. Wood, whose long connexion with the English Patent-office renders him a good judge, is of opinion that the American system is an utter failure. Mr. Smith, who has also had great experience, fully confirms this view; and I should be inclined to pause before we committed ourselves to an examination even for novelty. In the first place we don't want it nearly so much as is commonly supposed. There is already an examination for novelty—not an official one, I admit, but one actually made by intending patentees. You have been told by Mr. Aston the number of patents which are taken out, the number on which the third year's duty is paid, and the number on which the seventh year's duty is paid; but he has not given you another set of numbers, which I think are of at least equal significance—and that is, the difference between the number of patents applied for and the number finally obtained. This difference, as stated by Mr. Cole to-night, amounted to as many as 1388 in 1873, or practically 40 per cent. of all the patents that were granted and 32 per cent. of all that were applied for. Now these numbers represent almost entirely the result of the investigation into novelty carried on by the intending patentees; that is to say, they get their provisional protection, and between that and the time when the law compels them either to give up that protection or to complete their patents, they discover that their suggested invention was not new, or else that it is not useful. Now such an examination for novelty as this is, so far as it goes, a perfectly safe one in the interests of the patentee; but there must always be great danger that unless you have the very best men—not pettifogging men, but men of large and comprehensive minds—an examination for novelty may be made the means of discouraging most ingenious and valuable inventions. An instance of that was cited the other night in relation to no less a manufacture than the Bessemer steel process. I told you in the early part of the evening that I should have to revert to the Giffard Injector. Now the Giffard Injector is a machine by which a current of steam, issuing from the boiler with the enormous rapidity due to the pressure above the atmosphere, is brought into contact with water, in which it induces a current of so great a velocity that the water, and the steam which that water has condensed, unite together into a jet powerful enough to penetrate the very boiler from which the steam had issued against a pressure, such as is used in locomotives, of 100 or 140 lbs. on the square inch. Now I can imagine an Examiner for novelty saying, "This implement works by an induced current. An induced current is old. You cannot pass at the foot of a waterfall without finding that the descending water has induced a current of air. Moreover, forge-fires in Spain and elsewhere have been blown by currents of air induced by falling streams of water. Further, every furnace in a locomotive is urged by a current of air induced in the chimney by the waste-steam blast. Therefore induced currents are old, and this machine of yours, being based upon an induced current, is wanting in novelty." And remember, in doing this, the Examiner would not be doing any thing nearly so outrageous as that which the German Examiner did in respect of the regenerative furnace. I will tell you frankly that I am afraid of an inferior class of Examiner who, in his desire to do his duty, might be tempted to err by reducing every thing to its elements—to go, so to speak, to the very alphabet of things. It is common to hear in a court of law, in a patent action, the counsel for the defendant say to the jury when deprecating novelty, "What is there in the invention? Let us analyze the machine;" and he does so, and shows that it is made up of certain levers and wheels; and then he says to the jury, "You have heard me ask the plaintiff whether he pretended to be the inventor of a lever, and he told me that he did not, or of a cog-wheel, and he admitted that was old." And so the counsel goes on; and having clearly established the fact that all the parts of the machine are old, he appeals triumphantly to the jury to find a verdict in favour of his client. I am glad to say that the jury very seldom do any thing of the kind. They do not as a rule, suffer themselves to be led away by the sophistry of counsel, however ingenious it may be, but having heard of all the pains and labour which the inventor had bestowed on bringing his invention to perfection, they feel an honest sympathy with him, and look at the merits of the invention as a whole. But, although this is so with a jury who are trying, be it remembered, an action relating to an invention that is in practical use and has been infringed, I am afraid that in the case of an Examiner considering the novelty of an untried invention, we should have to encounter that which I call the "alphabet spirit," by which I mean that if there were an Examiner upon a question of copyright, he might (on the same principle that, I fear, would govern many Examiners in determining upon the novelty of an invention, the setting too high a value upon old elements) be betrayed into saying that there was no ground for a copyright in "Paradise Lost," because in the whole book he had not found a single letter that was not in the alphabet. Remember the account Sterne gives us of certain classes of critics. "And what of this new book the whole world make such a rout about? 'O! 'tis out of all plumb, my Lord, quite an irregular thing! not one of the angles at the four corners was a right angle. I had my rule and compasses, &c., my Lord, in my pocket'—Excellent critic!"

Just one other matter before I part from this point of refusal of patents for want of novelty. You must remember (for I have said it so often that I am ashamed to have to say it again) that I base my whole advocacy of patents upon the broad and sure, if not elevated ground of expediency, and not upon considerations founded on the supposed rights of inventors. Viewing the matter in this light I am strongly inclined to believe that, paradoxical as it may seem, there are perhaps special circumstances under which it would be expedient, in the interests of the public, to grant a patent for that which was not new; and I think the readiest way of putting before you what I have in my mind will be to state the particulars of a case that actually occurred. When you have heard it I believe but few, if any, words will be wanted to make its general application. The case is this:—Some three or four years ago there was an action in respect of the infringement of a patent for a multiple-furrow plough; the infringement was clear, the defendant having made so servile a copy, that without the closest inspection no one in court could distinguish between the model of the defendant's infringement and that of the plaintiff's invention; further the defendant being so servile an imitator it was idle for him to put forward "want of utility." His substantial defence was "want of novelty." After having searched through the copies of prior specifications, the defendant, however, could rake together nothing that would materially help him; for although there were plenty of multiple-furrow ploughs to be found, not one of them possessed the peculiar features which made the plaintiff's invention a success. At the very last moment, however, the defendant put forward an anticipation of the patent by a publication to be found in a book published more than 130 years before the date of the plaintiff's patent. The book turned out to be a very rare one, but the plaintiff's solicitors succeeded in finding a copy in the British Museum; on examining that book the plaintiff found in it a description of a multiple-furrow plough, which, although, it did not anticipate his invention, went quite as near doing so as did any of the prior specifications that had been examined.

Having stated these facts, I will now give you their very obvious application. Suppose that book of 1732 had contained the description of the plaintiff's very plough: the book, as I have told you, was a very rare one, and not likely to be found in the scanty libraries of farmers and of agricultural implement makers; but should a tribunal to examine into the novelty of alleged invention be established, the men who may be appointed to it will no doubt endeavour to inform themselves as far as possible of every thing that may bear upon the subjects that will come before them, and an official who investigated any matter even to its remote antiquity might possibly in his researches come across this all but buried book. According to the present law such an Examiner must tell the applicant, the inventor of the improved plough, "You cannot have your patent, your plough is not new; for, although neither you nor perhaps any other engineer or farmer is aware of it, there is a book more than 130 years old in the British Museum which contains a full description of your very invention." The applicant would find there was nothing left for it but to withdraw his petition for protection. As a natural consequence he would give the whole thing up, for it would no longer be worth his while to push his supposed invention, and the public would remain without the plough because the re-inventor was left without a patent.

It does seem to me that it is not expedient in the interests of the public that the matter should terminate in this fashion. I admit the difficulties that surround the question, difficulties so great that they may even turn out to be insuperable; but in any revision of the law I do trust that earnest consideration will be given to the question, whether it is not possible, and whether it would not be in the interest of the public, that some means should be devised by which a patent might be granted to an inventor in fact (so far as all practical anticipation went), although it might turn out he was only a useful awakener of that which was idly dormant.

I will now revert to the further recommendations of the Committee in 1866. Having, as I have told you, provided means for improving the obtaining of patents, they then turned their attention to the mode in which the patentee should exercise his right, and considered whether he ought to be under compulsion as regards the granting of licenses. Again, after most anxious deliberation, they came to the conclusion (although they were possessed with the strongest feeling against interference with property in a patent) that it would be expedient in the general interest that a patentee should be bound to grant licenses. With respect to the granting of licenses the terms, if they could not be agreed on, were to be settled by an officer to be appointed by the Commissioners, and these terms were, upon application either of the grantor or the grantee, to be subject every third year to revision. Further, that on the application from those manufacturers who may be affected by a patent, the Commissioners should have power, on such terms as may be considered right, and with the consent of the patentee, to purchase, out of any surplus funds arising from the fees paid for patents, the patentee's invention, with a view to its being thrown open to the public. I still believe that it is expedient there should be, as a rule, compulsory licenses. But my attention has been called to cases where such licenses clearly ought not to be granted. To settle the terms of the license there should be again an effective tribunal, such a tribunal as one would employ for determining the question of sufficiency of the specifications. The duties of such a tribunal would be most onerous. Just consider what they would have to bear in mind:—How much better is the process of this patent than the former state of the manufacture? What did it cost the patentee in money and in time to perfect his invention? What bargain was he compelled to make with some manufacturer in the way of reduced royalty in order to get his invention put to work? I especially call your attention to this point because the first impression of some of the members of the Committee was that licenses ought to be granted upon equal terms. Now it is a very common case for a patentee to agree with the manufacturer who first tries the invention for a low royalty. Clearly such a low royalty merely represents so much of the patentee's money spent in perfecting his invention, and should not be taken as a guide for a common royalty.

Again, a large manufacturer may undertake to work under the patented invention, and to produce so many yards or tons of goods per annum. It may well be worth the while of a patentee dealing in this wholesale way to give that manufacturer better terms than he would give to one who enters into no undertaking as to quantity. All such matters must be determined in each case as it arises.

Again, there are, as I have just said, instances wherein no licenses ought to be compellable. Such instances are rare, but they exist. Imagine a man having invented an improvement for utilizing some waste material, say hopbine; there is only a very small amount of this product in the world, not more, probably, in England than one or two manufacturers could deal with. The invention may only be of use as long as the material is cheap; but if several manufactories are established, and there arises a keen competition, then the very object of the invention will be frustrated. When, therefore, a patentee can show that he, or one or two licensees, is competent to grapple with all the trade that can possibly arise under the invention, then no injustice is done to the general public by refusing to compel the granting of other licenses. On the contrary, the public is benefited, because it is made worth the while of some persons to continue an industry that, if thrown open to all, would not attract the attention of any. If the system of compulsory licenses be adopted, then no further complaint can ever be made that a patentee stops an improver who comes after him. Mr. Hinde Palmer spoke on this point as though I had said in my paper that patentees in these relative positions always agreed; what I really stated was, that in nine cases out of ten they did so; and, speaking roundly, I think I am correct. However, in any reform of the Patent-law, it might be well to get rid of this ground of complaint.

The next thing to which the Committee of 1866 directed its attention was the trial of patent-cases. Their recommendations were briefly these :—That no proceedings should be commenced except upon the certificate of a competent examining officer; that application for such certificate should be founded on a written statement, specifying the part of the invention alleged to have been infringed and the manner of such infringement, and that the plaintiff should be bound by this statement in any subsequent proceedings. If the examining officer said that there was no ground for the proceedings, the intended plaintiff should not be allowed to take those proceedings, except upon the following conditions:—that his statement and the adverse opinion should be given in evidence; that the plaintiff, unless the judge thought proper to relieve him from it, should give security for costs; and that if the plaintiff were defeated upon the grounds stated in the certificate, he should pay all costs in the action of the defendant, as between attorney and client. With respect the trial itself, it was recommended that in every case the judge should have a skilled assessor, and that there should not be a jury unless by the request of both parties. Certain other minor provisions were made.

Now I think, with the exception of the proposition for International Patent-right, there is embraced in the foregoing report of the Committee of 1866 every thing that is demanded, and perhaps more than is really required, to free the working of the Patent-law from any of the defects under which it is alleged at present to labour. In common with Colonel Strange, and I trust in common with the majority of those present, I was extremely sorry to hear Mr. Samuelson's suggestion, that the persons to whom were to be intrusted the duty of superintending the working of the Patent-law in future were to exercise their functions, if not gratuitously, at any rate upon the receipt of a very small emolument. Now, to my mind, this is entirely wrong. I have no belief in the efficient execution of gratuitous work. The "great unpaid" has become a term of reproach. See what it is that you want. The examiners as to novelty must be men constantly engaged at their work. There must be various grades of these. I presume that, as regards such examiners, it is intended, even by Mr. Samuelson, there should be adequate varying salaries. But over and above even the highest of these you want some one man in respect of mechanical invention, and another in respect of chemical invention—men who will not readily be found—men of large experience, undoubted character, not crotchety, but of a judicial mind; the time of these men would be fully occupied; and is it to be supposed that such persons, who, as I have said, are rare to find and who probably (by the very talents that would make them valuable) are prosperous in their profession, should give up that profession and devote themselves for mere honour, or a small salary, to the most arduous duties? These same men would be the persons who would examine, as a final appeal, into the sufficiency of the specifications, and they would also be the persons to determine, or to preside over a tribunal to determine, all questions of compulsory license. Moreover, they would be the officers who would certify whether there was a *primâ facie* case made out for the instituting of a patent action, and they would sit as assessors with the judge.

Now, undoubtedly, the many interests involved in the manufactures carried on under patents are, as I have had occasion to say, something enormous; and evidently it must be for the benefit of the whole community that the very best assistance that money could obtain should be procured for the carrying out those industries in peace, quiet, and certainty, and for determining litigation in respect of patent matters when litigation did arise. No man has a higher respect for the Bench than I have, nor is there any one who has a deeper sense of the importance of the duties which devolve upon its members. I bear in mind that not only are all sorts of cases involving property determined before them, but also that the whole criminal law, even to the awful responsibility of trials involving the pain of death, depends upon the uprightness and intelligence of our judges. But having all this fully in view, I state it as my deliberate conviction that it would be far more easy to find to-morrow fifteen other Puisne Judges perfectly competent for the duties which would devolve upon them, and whose appointment would give entire satisfaction, than it would be to find the three or four men required for, and capable of fulfilling, the functions we have been considering in relation to the Patent-law; and I am quite sure that in any appointments to be so made a grave mistake will be committed if, both in social position and in emolument, the heads of the Patent Establishment are not placed on a level with the Puisne Judges and Vice-Chancellors. Remember that not one shilling need be taken from the taxes to pay these men. There is now a surplus of £90,000 per annum from patent-fees. The opponents of patents say, "If you can't amend the practice of the Patent-law there shall be none at all." You know I do not agree in this; but if they were right, this £90,000 per annum would be lost to the country. In any event, therefore, it is in favour of the taxpayer that so much out of this £90,000 as is necessary for the due working of the Patent-law, including the highest salaries of its principal officers, should be appropriated to that purpose, because that sum does not come, as I have said, from the taxpayers, but comes from a source (the patent-fees) which would be wholly destroyed, according to the opponents' views, were the practice of the Patent-law not improved, but which, if patents continue, will still leave a handsome surplus after the payment of every necessary expenditure upon an ample and befitting scale. Such an arrangement as I propose, I believe, would work creditably and well. The unpaid system, I am certain, would not so work. You could only get men to devote their leisure to the matter. Now, as men of position have next to no leisure, you would get but a very small share of the time of each man; you must therefore have a large and a varying body. Whenever this is the case, the secretary or other permanent officer becomes, in truth, the tribunal; and practically every patent question would rest in his hands, and the whole system would speedily fall into utter discredit.

I will now close this lengthy reply by apologizing to you most sincerely for the time that I have taken in addressing you, pleading as my excuse the great importance of the subject under consideration and the number of speakers whose views I have had to consider and to deal with;

and I am glad to be able to close it with a far more hopeful feeling than that with which I brought my paper to a termination, for at that time I had great doubt about the general sentiment in regard to the principle of a Patent-law. These doubts have now been, to a great extent, removed by the expressions of opinion that have been offered in this room and also by the unanimity of the press. I hope I am not too confident, therefore, in looking upon the abrogation of patents as now not a thing to be feared, and that whatever legislation we have to look forward to will not take that shape, but will deal with the necessary improvements, and will remove the last objection to those laws which I most honestly believe to lie at the very root of our prosperity as a manufacturing nation.

The CHAIRMAN, in moving a vote of thanks to Mr. Bramwell for the able paper which he had read in the first instance, and for the reply which he had now given, expressed his hearty concurrence in the universal praise which had been given to Mr. Bramwell, and ventured to express a hope that both these papers, together with the discussion, might be published in a separate and easily accessible form. He also thought it would be desirable if the report of 1866 were printed as an appendix to it. He was instructed by the Council to announce that they had formed a committee, which he was quite sure would not allow this matter to rest.

The vote of thanks having been unanimously passed, and briefly acknowledged by Mr. Bramwell, the proceedings terminated.

APPENDIX A.

MEMORIAL TO THE LATE MASTER OF THE ROLLS, AND ANSWER THERETO, AS TO ADDITIONAL COMMISSIONERS OF PATENTS*.

(Copy of the Memorial.)

To the Right Honourable the Lord Romilly, Master of the Rolls.

My Lord,—The great use of patents is to make known the inventions, processes, and secrets of others. It is therefore highly important that the mass of information accumulated at the Patent-office should be made available, so as to make known as far as possible all inventions and modes of manufacture for the benefit of the country. The advantage of so doing would be immense, and would help to keep the manufactures of this country in advance of others. Action in this direction on the part of the authorities has been prayed for in every memorial that has been presented.

One of the first memorials was presented by the Institution of Mechanical Engineers, with Mr. Robert Stephenson as President at its head. This was presented in 1853 to the Right Honourable Frederick Lord Chelmsford (Lord High Chancellor of Great Britain), the Right Honourable Sir John Romilly (Master of the Rolls), Sir Fitzroy Kelly (Her Majesty's Attorney-General), and Sir Hugh McCalmont Cairns (Her Majesty's Solicitor-General), and prayed for greater facilities being given to persons making inquiries in any branch of knowledge at the Patent-office.

The second memorial, in 1862, was presented to the Right Honourable Sir John Romilly. It prayed, amongst other things, for "a building as an office for patents, including in it a complete library, a commodious reading-room, and suitable offices for a proper staff of clerks and others to prepare well-digested and numerous abstracts and abridgments of inventions and processes, made public either by the specifications of patents or otherwise, and whether English or foreign."

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* See Colonel Strange's remarks in discussion, p. 53.

A third memorial was presented to Sir John Romilly in 1864. It prayed not only that the efficiency of the office should be increased, but called the attention of the Commissioners to recent reductions in the staff and its disorganized state—which staff was "utterly inadequate to satisfy the requirements of persons seeking information among the very numerous works contained there." The memorialists went on to state that "they had entertained the hope that, so far from a reduction being made, there would have been an increase ordered to such an extent as would have enabled the abridgments of the specifications in the various branches of art (which abridgments were commenced about seven years ago) to be pushed vigorously forward, so as to complete the abstracting of the whole of the original specifications, and to keep up those abstracts from year to year as new matter is furnished. Your memorialists feel it is hardly possible to overrate the advantages to be derived by the public from a complete and intelligent system of abstracts; and they venture to urge upon the consideration of the Commissioners the necessity of at once providing a sufficient number of qualified persons (to be under the entire control of the scientific officer appointed by the Commissioners to superintend the specifications) to assist that officer in preparing such abstracts, and also to collect and epitomize scientific information generally."

The president and members of the Institution of Mechanical Engineers addressed a memorial in 1864 to the Right Honourable Lord Westbury, then Lord Chancellor, bringing under his Lordship's notice the fact "that very great loss and delay are occasioned to manufacturers, inventors, and others, by the want of a complete classification and the prompt indexing of all inventions, whether patented or not, foreign as well as English. Such a systematic arrangement as is needed is quite within the compass of an efficient staff of officers possessed of technical knowledge, and could be at once proceeded with; the state of inventions could then be ascertained, and the common case of several persons patenting the same thing would be avoided."

In 1864 a Select Committee of the House of Commons inquired at great length into the working of the Patent-office; and reported, in accordance with the general tenor of the evidence, that much more was required to be done at the Patent-office to render it efficient, that more attendants were required, and "that the want of increased accommodation was so much felt as to prejudice the due administration of the Patent-law" (paragraphs 3 and 4 of report; answers 10 to 13, 18 to 21, 658 to 662, 667, 817, 863, 1038, and 1039 of evidence).

We merely allude to the opinions expressed by the Select Committee of the House of Commons, scientific men, manufacturers, engineers, and inventors, as the various memorials and other documents are in the possession of the Commissioners of Patents; but we would further mention that the various Commissioners of Patents have from the year 1858 reported from time to time to the Lords of the Treasury that great improvements were wanted, and a good building urgently required for the purposes of the Patent-office.

In conclusion, we beg to state that it is our decided opinion, and that of many of those who have signed various memorials, that it would conduce greatly to the progress of manufactures and the advancement of commerce if the large stock of knowledge of inventions and processes, both patented and open, stored at the Patent-office were made available to manufacturers and the public generally; and this your petitioners believe would best be compassed if Her Majesty were graciously pleased to appoint that "other person as Commissioner of Patents" as contemplated by the Patent-law Amendment Act of 1852, and if the staff at the Patent-office were augmented by the addition of a sufficient number of persons, possessed of good technical knowledge, and well able to abstract all specifications as they came in daily, so that they might at once be entered into an efficient subject-matter index, which would give a true indication of what was in the specifications. In addition to this, of course, the large number of specifications already at the office would require to be abstracted and entered in a similar manner in a new edition of subject-matter indexes, that would really indicate what was contained in each specification, which the present indexes do not. Further, we beg to urge that similar subject-matter indexes be formed of all inventions and processes comprised in the very numerous indexes and tables of contents of the scientific books contained in the excellent scientific and technical library of the Patent-office; so that any person using due diligence might easily learn with tolerable certainty whether an invention were new or old, which is not now the case.

We beg to append a sample page of such two subject-matter indexes as we would submit are urgently required. It is almost superfluous to mention that there are now several hundred thousands of pounds accumulated surplus, and an annual surplus of about sixty thousand pounds, contributed by the very class of persons who would benefit by such improved indexes.

L. L. Dillwyn, M.P.
Richard Baggallay, M.P.
Charles Fox, M.Inst.C.E.
Charles Hutton Gregory, Pres. Inst.C.E.
Edward Woods, M.Inst.C.E.
C. William Siemens, M.Inst.C.E., F.R.S.
Robert Mallet, M.Inst.C.E., F.R.S.
Frederick J. Bramwell, M.Inst.C.E. Council.
Edward A. Cowper, M.Inst.C.E.

20th March, 1868.

(Copy of Reply of the Master of the Rolls to Mr. Dillwyn.)

Rolls, 31st March, 1868.

Sir,—I transmitted to the Lord Chancellor the memorial presented to me on the 20th March instant by yourself and the gentlemen who accompanied you, relative to the present state of the Patent-office, together with my views on the subject; and we have since considered the matter in consultation together.

The result of this is that we are prepared to recommend to Her Majesty's Goverment that three gentlemen should be appointed to act as Commissioners of Patents together with the Lord Chancellor and the Master of the Rolls for the time being—one to represent mechanical science, another to represent chemical science, and a third to represent the subjects more usually and more especially comprised in the term "Natural Philosophy." We should propose that the gentlemen to be recommended to Her Majesty for this purpose should be, as regards the first, from gentlemen to be nominated by the Society of Mechanical Engineers; as regards the second, from gentlemen to be nominated by the Chemical Society; and as regards the third, from gentlemen to be nominated by the Council of the Royal Society. But we are not prepared to recommend that any salary should be attached to the services of these gentlemen. We trust and believe that gentlemen fully competent for the purpose may be found, who have sufficient leisure, and who from their love of science and their desire to disseminate more widely the discoveries made in these branches of science, would be willing to give their services without remuneration, and to superintend the general management of the Patent-office, to see that the indexes and abstracts of the specifications are made accurate and complete, and to redress the other defects complained of in your memorial, acting in all these respects in conjunction with the Lord Chancellor and the Master of the Rolls, to whom they would refer whenever the occasion might require it.

I think it, however, desirable to repeat that, on fully considering the subject, both the Lord Chancellor and myself have arrived at the same conclusion, that it would be inexpedient to create either one or more salaried officers for this purpose; and to say that we should both, if applied to, recommend Her Majesty's Government not to accede to that part of the views of the gentlemen who composed the deputation which had relation to the creation of paid officers.

ROMILLY.

L. L. Dillwyn, Esq., M.P.

APPENDIX B.

SOCIAL SCIENCE ASSOCIATION COMMITTEE'S RESOLUTIONS ON PATENT-LAW AMENDMENT.

(A.D. 1866.)

1. That the law officers should have no original jurisdiction in the application for or the granting of letters patent, in the matter of disclaimers or of memoranda of alterations.

2. That provisional protection should be granted, not upon the certificate of the law officer, but upon the certificate of an examining officer, subject to an appeal to the law officer in case either of the granting or refusal thereof.

3. That patents should be granted only after the examination and report of competent examining officers as to the novelty of the invention, as to its being the subject-matter for letters patent, and as to the sufficiency of the provisional specification; but that where the report is adverse the applicant should be, nevertheless, entitled to obtain his patent, subject to the following conditions:—

a. That the adverse report should be recorded, and printed with the specification.

b. That in any proceedings, on or against the patent, the patentee should give security for costs.

c. That in any such proceedings the patentee should be liable to the payment of costs of the opposing party, as between attorney and client, in case he should be defeated on any of the grounds stated in the examining officer's report. The conditions as to giving security for costs and payment of costs, as between attorney and client, to be satisfied upon the certificate of a judge upon the trial of any cause that the validity of the patent has been affirmed at the trial.

4. That any opposition to the granting of letters patent should be heard by the examining officer reporting upon the application for such letters patent.

5. That the granting or the refusal of letters patent should be subject to an appeal to the law officers or law officer acting as a court, or judge, or judges of appeal, subject to a final appeal to the Lord Chancellor.

6. That any disclaimer or memorandum of alterations should be allowed only upon the certificate of an examining officer, subject to an appeal to one of the law officers, with a final appeal to any one of the courts of law or equity.

7. That patents should not be granted for a foreign invention, in fraud of the rights of the true inventor thereof.

8. That the specification, as filed, should be reported on by the examining officer, and if the same be not in accordance with the provisional specification, or do not particularly describe and ascertain the nature of the invention, the patentee should be required to amend the same to the satisfaction of the examining officer; and in the event of the same not being so amended, the examining officer's report thereon should be printed with the specification, the decision of the examining officer requiring any amendment, and his decision as to the form thereof, to be subject to an appeal to the law officers, whose decision should be final.

9. That no proceedings for infringement of patents should be commenced except upon the certificate of a competent examining officer. That the application for such certificate should be founded on a written statement, specifying the part of the invention alleged to have been infringed, and the manner of such infringement; by which statement the plaintiff should be bound in any subsequent proceedings upon the patent. That such statement may be amended by leave of a Court or of a judge. If the examining officer's certificate state that, in his opinion, there is no ground for the proposed proceedings, the intending plaintiff should only be allowed to take such proceedings upon the following conditions:—

- *a*. That such statement and adverse certificate should be given in evidence in the subsequent proceedings.
- *b*. That the intending plaintiff, unless otherwise ordered by a Court or a judge, should give security for costs.
- *c*. That in any such proceedings the plaintiff should be liable to the payment of costs, as between attorney and client, in case he should be defeated on any of the grounds stated in the examining officer's certificate.

10. That the trial of patent causes, as at present conducted, is unsatisfactory. That such causes should be heard before a judge sitting with one assessor, but without a jury, unless all parties to the cause should desire a jury. That the assessor should be appointed by the parties, with the approval of the judge; and, in case the parties should

not agree as to such appointment, the assessor should be appointed by the judge.

11. That, in any proceedings, the objections to the patent should be stated with particularity, to the satisfaction of the examining officer, subject to amendment, by leave of the Court or a judge.

12. That in proceedings on letters patent it should be competent for the Court, or a judge, to refer any application to an examining officer for his report thereon.

13. That the grantee of letters patent should be compellable to grant licenses for the use of his invention, subject to the following conditions:—

- *a.* That such licenses, as to their commencement, their duration, the amount to be paid, the manner of payment, and all other matters, should be settled by an officer to be appointed by the Commissioners, or by arbitration, in the usual manner, at the option of the patentee.
- *b.* That such licenses should be subject to revision every third year, at the option of the grantor or grantee respectively.

14. That any licensees should have the option of continuing the patent by paying the stamp-duty at the end of the third and seventh years, the amount of such payments to be deducted from accruing royalties.

15. That, on application from the class affected by any patent, the Commissioners should be empowered on such terms as they may consider right in the interest of the public, and which may be agreed to by the patentee, to purchase, out of any surplus fund arising from the fees paid for patents, the patentee's invention, with a view to its being thrown open to general use.

16. That it is expedient that the term of letters patent, in cases of exceptional merit and inadequate remuneration, should be extended, and that the exercise of this power of extension, on the recommendation of the Judicial Committee of the Privy Council, has given general satisfaction to inventors and the public.

17. That it be suggested to the Commissioners to carry out forthwith such of the foregoing resolutions as may not require further legislation.